

THE EPIC OF AMERICAN INDUSTRY

By
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THE EPIC OF AMERICAN INDUSTRY

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To
E. H. W.

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PREFACE

Our people enjoy both political freedom and an abundance of this world's goods. The two are vitally interrelated. Liberty serves to release untold productive energy and a high standard of living fosters democratic principles of government.

Today these are rare blessings. Their attainment comprises a success story of American business and civilization. It is a record of the trials and triumphs of little business and big business, of trader, trapper, farmer, blacksmith, workman, entrepreneur, merchant, and manufacturer. Particularly is it the saga of those who, according to Lincoln, must be beloved of the Lord because he made so many of them—the common people.

This book is an attempt to review some of the most significant of these adventures. It is in no sense an excursion into formal history. Rather it is a story told by an active participant in the business system of how that system has worked down through the three centuries from Plymouth to Detroit.

Limitation of space has necessitated the omission of many important developments. It was unfortunately found impossible to include a treatment of some of our great industries. Such exclusion, however, carries no implication of judgment on the relative significance of various areas of our economic order. Selection of subject material was simply one storyteller's choice of those events in each period which were to him most revealing or most interesting.

We Americans are pre-eminently a business people. This has been so from the time of Jamestown and Plymouth. Starting with the Virginia Company, the Massachusetts Bay Company, and the Dutch East Indies Company, trade has been at the core of our make-up.

Our colonial economy was built on foreign commerce. But as this grew, it ran afoul of certain Old World ideas. England and the Lords of Trade in London would channel our commerce and strait-jacket the enterprise of our businessmen.

Trade, however, abhors barriers. In seeking liberty to trade we were impelled to secure political freedom. The winning of the Revolution and the adoption of the Constitution had their roots in our economic necessities. We achieved a scheme of things wherein the doors of opportunity were flung wide to give each individual freedom to seek a higher standard of living in ways of his own devising.

In all reality this was new. We might properly call it the American

system. Since its inception we have forged and hammered to give it form and endurance. The accomplishments have been thrilling.

We pushed a frontier from the Atlantic coast some 3000 miles to the Pacific. With the steam-boat and steam locomotive we constructed a vast transportation system to unlock the inland wealth of a continent. We built an abundant agriculture. We have led the world in the quantity production of goods and their wide distribution. Over the seven seas we have furrowed grooves with our shipments of cotton, wheat, farm machinery, sewing machines, motor cars and movies. Hence both for ourselves and for others in the remotest corners of the globe we have opened new horizons in standards of living.

But this was not all. The American system attained an even higher destiny. Twice within this generation have its production achievements given us the means to turn back the military hordes of aggressor nations bent on conquest. For us and for millions of like-minded people the world over it has kept the light of liberty aflame. Even to-day, in the disillusioning years of the cold war of the late 1940s, it is this industrial power which holds out to us and to free people throughout the world the greatest hope for stemming the onrush of another barbarian invasion.

Thus when one views in the long perspective of over three centuries the accomplishments of our business system, from the first colonial trade in salt cod and tobacco down to its present position of world leadership in affairs of war and peace, one can truly say—the story of American industry is indeed an epic.

THE EPIC OF
AMERICAN
INDUSTRY

*The Duke of Norfolk deals in Salt
The Douglas in red herrings
And guerdoned sword and titled land
Are powerless to the notes of hand
Of the Rothschilds and the Barings.*

OLD VERSE

I.

BUSINESS IN THE MOTHER COUNTRY

Seventeenth Century England

THE story of business during any period is a narrative of man's efforts to survive. But the goal is broader than merely sustaining existence. Almost equally impelling is the desire for an over-rising scale of living. This theme is overlaid with others so that the pattern of motive is never simple. The peculiar nature of human nature does much to complicate the tale. An innate love of adventure and a driving restlessness contribute strands to the texture. The greed of some men and their ruthlessness provide the somber background which serves to highlight the inherent goodwill of the majority.

The sinews of trade support the whole body, social and politic. The needs of business through the ages have molded the destinies of nations. They have begotten wars and compelled peace; unseated kings or enthroned charlatans; stimulated political progress and at times retarded it. Over and beyond all this, however, trade between man and man has constantly tended to raise standards of living and develop a common brotherhood.

Business started when some cave man ancestor who was fairly adroit at trapping game got the idea of swapping furs for grain with the little fellow down in the valley. Since then one thing has inevitably led to another as man struggled to eke out an existence and improve his lot.

The important developments of business in a particular era cannot be sharply differentiated from those that have gone before. The origin of many practices is lost in antiquity. The growth of others spreads over centuries. Although at times there are periods of slack water, there is nevertheless an unbroken continuity. It is difficult to grasp the significance of some particular epoch considered solely by itself.

In order, therefore, to understand the development of business in the

United States it will be helpful to note the conditions prevailing in the Old World at the time migration started to these shores. Because the main line of colonial heritage stems from England, it is entirely fitting to consider briefly its business system.

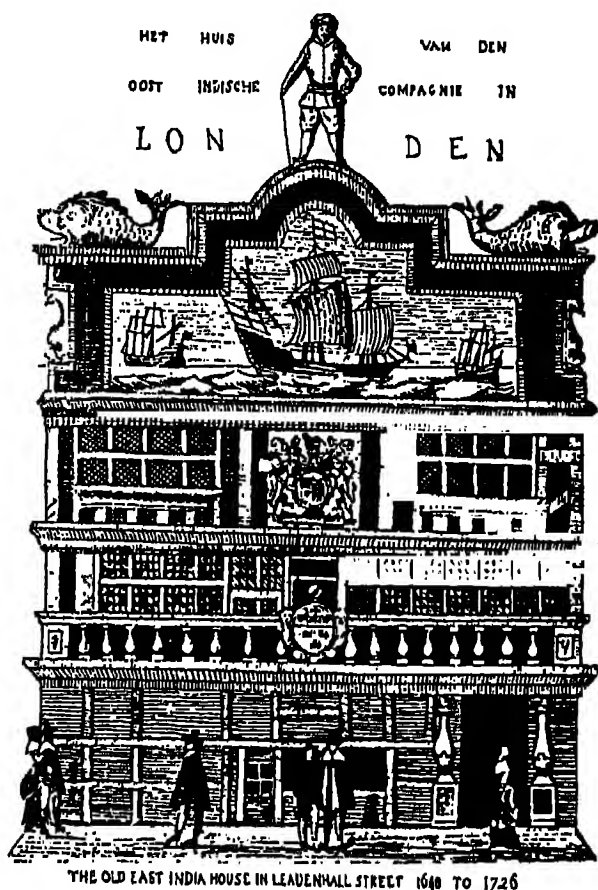
The basic pattern was well defined. Physical and geographical characteristics had played their usual part in determining the commercial destiny of the world's most renowned island. An equable but rather moist climate provided England with excellent pasturage. Sheep grazed on these lush acres yielded wool of a superior grade. English spinners and weavers were able to produce woollen cloth of high and uniform quality. An abundance of good harbors and proximity to populous continental markets facilitated foreign trade. The export of woollen cloth became the keystone of the arch of English business, and from this humble start grew the supreme economic empire of the nineteenth century.

But it was more than a mere matter of climate and geographical location. These Englishmen were of a particular breed. That they had a genius for organization and self-government was shown by their orderly parliamentary system and the development of the Common Law. They were also possessed by a Daemon of Unrest and had marked ability in human relations. This impulse for adventure was not simply a matter of derring-do and lust for conquest. The infusion of Viking blood may have had something to do with determining these qualities, for apparently the Viking rover also had an eye for business. When this gentleman was finally laid to rest, it was customary to place a pair of scales beside him along with his sword and buckler. Even in the next world he was going to be ready for a little light trading if the opportunity offered.

Commerce during the seventeenth century was, of course, almost entirely water-borne. At the time the *Mayflower* was buffeting its way to our shores, ships of even smaller tonnage were pressing to the ends of the earth in the interests of world trade. The merchants of Amsterdam and London were doing a thriving business from the Baltic in the north to India in the far east. The exchange of goods between countries had reached a well-ordered development as contrasted with the primitive condition of manufacturing. Big business in the seventeenth century was foreign trade. Its center of greatest activity was Amsterdam which had succeeded to the former glories of Phoenicia, Athens, Florence, Venice, and Genoa. The Dutch were definitely the leaders in the world of commerce. Although London was forging ahead, its formula for doing business was largely to follow Dutch practices.

By the seventeenth century capitalism had advanced to provide the essential structure of the English economy. Its evolution down through

the years had been a slow but irresistible process. The ancient craft-guild system of unrelated small shops had been forced to give way before newer ideas of doing business as the growth of foreign trade brought about a more pronounced division of labor. What happened was that the abler



THE FIRST EAST INDIA HOUSE

From *Ledger and Sword* by Beckles Willson
Longmans, Green & Co.

proprietor-artisans endowed with finer skills and greater initiative gradually attained broader experience in marketing. They then contracted for the product of less successful competitors, providing the latter with the raw wool and yarn. The result was that these proprietor-artisans and merchants who had demonstrated superior business acumen gained con-

trol over more production and the reward for reinvested earnings was greatly increased. The process was in a sense regenerative, as the activating pools of capital were reemployed to broaden markets and improve production.

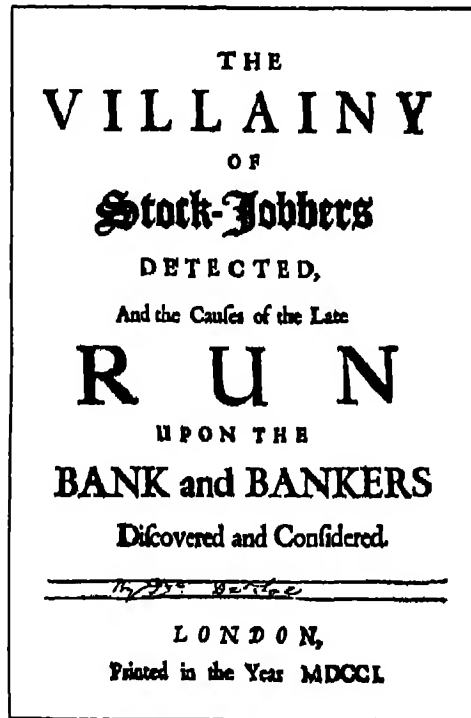
The Crown at first looked with jealous eyes on these growing accumulations of the coin of the realm. There was not only utility but a strange new power in the sturdy ironbound chests of these merchants. But Englishmen even in high places are nothing if not adaptable. Accordingly the Crown began to make up to these crude burghers who understood the matter of making one shilling grow into ten by means of trade across the seas. In order to get loans and advances to defray the mounting expenses of government, the Crown offered monopolies and various types of protection. Business and government developed a mutuality of interest and became interdependent. As capital grew those who owned it attained recognition. A middle class developed. Finally this middle class became government through the ascendancy of the House of Commons. The identity of interest was thus complete. England had a businessman's government and government was made up of businessmen. So it remained for well over three centuries. When the Corsican Conquistador was thwarted by England's maritime power, he referred scornfully to "a nation of shopkeepers." He failed to note that it was the shopkeeping that produced the maritime power.

A mutuality of interest between government and business was as natural to an Englishman of that period as the air he breathed or the ale he imbibed. The broader aspects of this relationship in international affairs came to be known as "mercantilism." It was the dominant political and economic philosophy of Europe in the years during which America was colonized. No correct understanding of those times or of our subsequent quarrel with the mother country is possible without recognizing its influence.

Mercantilism implied that a government should direct its policies and control the business activities of its citizens toward the common end of successful foreign trade and a favorable balance of international payments. Accordingly England subordinated agriculture and fostered such an industrial economy as would best attain that goal. Domestic and foreign affairs were shaped so that in effect the nation was an organized economic unit competing in world trade with other countries following a similar ideology.

It was, therefore, quite natural that Parliament and the Lords of Trade should look upon the colonies from this mercantilist point of view. The planters in Virginia and the merchant traders in Massachusetts were re-

garded as minor members of an economic team playing for dear old Alma Mater. As such their activities were constantly to be subordinated to the interests of English businessmen. Thus it was largely mercantilism which lay at the root of the subsequent difficulties between the mother country and her sons in America.



The perennial whipping boy!

Title page of pamphlet issued in 1701 by Daniel Defoe, complaining about fluctuations in the price of the stock of the Dutch East India Company.

In this close relationship between government and business, monopoly was an accepted and honorable institution. Particularly was this true in foreign trade. Thus in the seventeenth century the world of English foreign commerce was divided between great concerns which at times enjoyed exclusive privileges in certain areas. The Eastland Company did business in the Baltic; the Merchant Adventurers covered Germany and

the Low Countries; the Levant Company traded in Asia Minor; and the East India Company operated in like manner in India and the East Indies.

A striking characteristic of these companies was their quasigovernmental nature. For example, the Merchant Adventurers, known officially as the "Governor, Assistants and Fellowship of Merchant Adventurers of England," had the power to maintain in the Low Countries and Germany a court of law which had civil jurisdiction over all Englishmen in those territories. "The Governor and Company of Merchants of London Trading into the East Indies" had the right to acquire territory in its own name, issue currency, and maintain military establishments as well as to dispense justice in both civil and criminal cases. In effect these large foreign trading monopolies were clothed with qualities of statehood, a precedent not lost upon the colonists who settled North America.

While the organization of English foreign trade followed an outline strange to the modern businessman that of the domestic economy was startlingly familiar. The principal industries were textile (woolen cloth), coal mining, and iron making—well-defined shadows of economic glories to come. Similarly we note that in production the division of labor was moving forward vigorously. Capitalism was clearly developed and rapidly growing more powerful. The factory system was just starting. There was both big and little business. Combinations were being formed with both horizontal and vertical integration of elements. Double-entry bookkeeping was generally accepted in commerce. Credit was widely employed through the bill of exchange and marine insurance was used on foreign shipments. Deposit banking had been started by the goldsmiths and over the financial scene loomed the Bank of England founded in 1694. And, just to make the modern feel more fully at home, government was floundering between policies favorable to open competition and those by which it strove to intervene in business affairs.

II.

WHY THE COLONISTS CAME

Their Lucky Landfall

MUCH attention has been devoted to the religious motives which directed colonists to America. Too little, however, has been said of the commonplace everyday facts which impelled the great majority to pull up stakes and risk their all in the New World. According to Weeden, "The most common and positive desire of the fathers of New England was not to worship in a particular way, nor to establish a particular form of government, but it was to live. . . .

"They built the rough meeting-house and met there devoutly but they tugged hard at the cod-lines on the seas, and labored manfully to saw pipe-staves on the land. So, in later days, it was the economic resistance of the New Englander to Grenville's taxes, and not any absolute rebellion against the authority of King George, which marshalled the American freemen at Bunker Hill." ¹

During the seventeenth century, life in Old England was not all beer and skittles. Wars, revolution, and generally disturbed political conditions kept things in an almost constant turmoil. Business, of course, suffered accordingly. As the English economy depended on foreign trade, whenever the Dutch got out their shooting irons Englishmen had to forego the pleasures of ale and meat pies. There was much unemployment and even the most skillful artisans had little sense of security. Under the Poor Laws, the workman out of a job was forbidden to leave his parish to look for work. Although the uncertainties of colonial life might cause any prospective colonist to pause and consider, there was no outstanding inducement to stay at home.

Another factor which played an important part was the English land-holding system. The total area of productive soil was not great. Much of

¹ Notes will be found at the end of the book.

it was tied up in landed estates or the holdings of the county gentry. There was an almost closed door facing the workman who desired to become a proprietor. Consequently, receptive ears listened to stories of the new land at the end of the Western Sea, where life was bountiful and hope a glowing, living thing.

This great movement across the Atlantic was promoted and financed not by government but rather by business institutions and the new economic infant, capitalism. We have already seen how capital began to accumulate in England. It was this same capital, managed by venturesome British merchants, that provided for the expenses and costs of founding the American plantations. Government itself did comparatively little. Businessmen and the adventurers themselves got together the goods and equipment with which a new continent was to be conquered. For example, even as early as 1613 the Virginia Company of London had some £46,000 invested in the colony.² That was no inconsiderable sum. Capital did these things, took these outside chances, not for altruistic reasons but with the idea of making a profit.

Not only were the funds of business called upon, but also its procedures were employed in colonizing the plantations. The Virginia Company of London was a joint-stock company. The Pilgrims constituted themselves a joint-stock association without charter. The Massachusetts Bay Company was a chartered joint-stock company. At New Amsterdam and on Delaware Bay, the Dutch West India Company started operations for trading purposes. Later the Swedes with their South Company of Sweden were to settle along the Delaware River.

In this connection it is interesting to note the manner in which the shares of the Plymouth Association were divided. There were three classes of stockholders:

First those colonists who undertook to subscribe capital as well as to go to America. These received one £10 share for each £10 of capital and one share as a planter;

Next the colonists who did not subscribe capital, each of whom received one £10 share;

Finally there were the London merchants who participated only as capitalists. They were given one £10 share for each £10 subscribed.

The Articles of Association also provided that the capital and profits were to remain in the Association (a *joint stock*) for a period of seven years, after which time distribution was to be made according to the share holdings.

In considering the use of the joint-stock company in the founding of American colonies, it is important to remember that these institutions were

patterned on the older companies in England, such as the East India Company, and in some instances were founded and managed by the same people. We have already seen how these earlier overseas trading associations and companies had been granted certain rights of sovereignty. It was therefore quite natural that thoughts of governmental autonomy should take root in the companies operating in America. If the East India Company was in effect a sovereign state in the East, why should not the Massachusetts Bay Company have the same characteristics in the West? In view of this historical line of thought, the difficulties of communication, and the "salutary neglect" of the British Government, a sense of local sovereignty came naturally to the colonists. It was inevitable that this would sooner or later bring conflict with the parent government.

There were several basic factors which contributed to the success of these first ventures across the Atlantic. In the matter of climate the colonists were lucky indeed. They came ashore in what Ellsworth Huntington calls the "Fortunate Middle Latitudes,"³ where the coastal regions sustain both mixed and deciduous forests. Here man is able to secure the most effective combination of abundant agriculture and conditions favorable to the establishment and growth of industry.

In addition to climatic advantages, there was another important matter of geography which helped tremendously. Adjacent to the coasts of New England are the Grand Banks of Newfoundland. These consist of a plateau about 300 miles in length which rises above the lower bed of the Atlantic. "On the south side, the banks are washed by the warm current of the Gulf Stream, and on the north by a cold arctic current from Greenland. The currents bring with them innumerable diatoms and algae, too small to be seen except with a microscope. These form the food of billions upon billions of almost incredibly small lobsterlike crustaceans and tiny mollusks like microscopic oysters. These in turn supply food to small fish such as herrings, which are the favorite food of cod and other larger fish."⁴ Thus New England, with its extensive forests of ship-building timber, lay on the threshold of one of the world's four great fishing areas, the others being off the northwest coast of Europe, the Pacific coast of North America from California to Alaska, and the east coast of Asia near Siberia and Japan.

Furthermore, this *terra incognita* to which the colonists had consigned themselves possessed characteristics advantageous to commerce. On the Atlantic coast, between Cape Hatteras and Cape Ann, are many good harbors for ships of today's large tonnages but for the shallow-draft craft of the seventeenth century there were literally innumerable ports of refuge. Also there are few major hazards to navigation. No other such continental

coast line exists anywhere in the world in the "Fortunate Middle Latitudes."

Finally, supplementing the many and well-distributed salt-water harbors, there is an extraordinary inland waterway system opening up from the coast. This includes such fine passages as Chesapeake Bay with its Virginia estuaries, the Susquehanna River, Delaware Bay and River, the Hudson River, Long Island Sound, the Connecticut River, Buzzard's Bay, and Massachusetts Bay. All of this gave the colonists not only safe and convenient communication along the coast but ready access to the fertile lands which lay immediately back country.

While nature thus furnished an exceptionally favorable combination of resources, we must not overlook the fact that their exploitation called for heroic qualities in those who knocked at the door of the continent. It was in truth a most fortunate circumstance that brought to this particular part of the Atlantic coast a people of remarkable adaptability possessed of a genius for colonizing and for trading over the seven seas.

A striking aspect of their adventures was the necessity for changes of purpose imposed by the new environment. The Virginians, for example, started out seeking avidly for gold and shortly found themselves pursuing an agricultural treasure—tobacco. The New Englanders, intent upon establishing "plantations," quickly switched to fishing and foreign trade. These adjustments were not easy. However, when it became evident that new pursuits were called for, the colonists showed themselves flexible and resourceful. Indeed, when one considers the remarkable advantages of climate, the excellent harbors and coastal waterways, the rich agricultural lands upriver, the relative proximity to the markets of Europe, and the outstanding qualities of the colonists, it is no wonder that those worthy heirs of the old Viking traders built not only a profitable system but a great civilization as well.

III.

THE PURITAN TAKES THE COD TO MARKET-- WITH A DASH OF RUM

WE SHALL now meet one of the most extraordinary manifestations of the law of survival of the fittest—the Yankee merchant. One will travel far down the reaches of history and find, perhaps with some relief, few that can be called his equal. In the light of modern standards one is tempted to criticize or condemn some of his actions. In the end, however, one winds up with deep admiration and respect for many of his qualities.

If he was a tough-fibered, close-fisted, horse-trading, seventeenth-century go-getter, the answer is—he had to be. In any case, we are thrilled by his resourcefulness, his business acumen, and his never-say-die spirit. He may have "wortered" the rum with which he traded or short-measured his customers, but here was one who would not stay licked and who feared neither man nor devil. To us he will seem at times a hypocrite. On the other hand, we know he was fundamentally a man of devout spiritual quality. He was hard-working, self-disciplined, and thrifty beyond thrift itself. He was also narrow, bigoted, and brazenly two-faced. That he was especially anointed by the Lord, he accepted with an alacrity not entirely shared by those with whom he did business. Profits and prayers were strangely mixed. "Stephen Winthrop writes home from St. Christopher's that he has sold the wine; the simple statement of fact is not enough: he adds, 'Blessed bee God, well sold.'"¹

Apparently one of the first to discern the economic future of New England was none other than Captain John Smith. The story is that, having cruised along the New England coast and seen the teeming marine life, he predicted that cod would become a source of wealth equal to gold. From Captain Smith, the great gold hunter, that was praise indeed. Few prophecies in history have been more generously fulfilled or more glori-

ously exceeded. Starting with a few cod lines and an assortment of axes and saws, these first New England settlers built a colony of commerce. Then upon this base they erected a business empire. Trade was where they found it and they searched the seven seas. The harbors of the world became the day-to-day marts of these dauntless Yankee merchants.

The center of interest in the early period is naturally the Massachusetts Bay Colony, or, as it was called in the royal charter granted in 1629, "Governor and Company of the Mattachusetts Bay in Newe-England." The stockholders of this chartered company were mostly men of substance. It was essentially a business institution.

In view of the destiny of this enterprise, certain characteristics of its early form are notable. Many of its backers, merchants of moderate wealth, planned to migrate themselves. The charter was therefore drawn to permit the development of a colony with an unusual degree of self-government. This gave the colonists justification for taking the charter itself to Massachusetts Bay and then declaring the colony the seat of the corporation. Such action was significant. Other trading companies were ruled from London or, in the case of the Dutch West India Company, from Amsterdam. Also of significance was a clause in the charter granting broad exemptions from present and future taxes. From the very outset we observe earmarks of a unique destiny, or, as James Bryce puts it, of how "the trading Company grows into a colony, and the colony into a State."²

The first arrivals in New England had scarcely landed when they started trading with the Indians. Woolen goods, knives, hatchets, and trinkets were in demand. All the poor tribesmen had to barter with was a liberal supply of beaver pelts. These were accepted with active accommodation. It just so happened that the fur of the beaver had a ready exchange value all over Europe. Even as early as the winter of 1621, the Plymouth colony's first year, we find the colonists sending two hogsheads of beaver pelts back to London. This was nine years after the first shipment of tobacco from Virginia. Trade with the Indians was pushed aggressively along the coast and up the rivers. It was the first business of our Yankee merchants.

As settlements along the coast sprang up it was only natural that these restless colonists should also develop a brisk interchange of goods among themselves. Thus the coastwise trade was born. "The Dutch, as early as 1628, brought goods by the way of Buzzard's Bay and Manomet to Plymouth Colony. . . . A pinnace brought Virginia corn to Salem in 1631. . . ."³

From this time onward the coastal traffic grew rapidly. Boston became the mart for the whole New England coast. Her merchants sent their little sloops west to Connecticut and down east to Maine and Newfoundland

July 14th. 1703. Prices of Goods

Supplied to the
Eastern Indians,

By the several Truckmasters; and of the Peltry received
by the Truckmasters of the said Indians.

One yard Broad Cloth, three Beaver skins, in season.
One yard & half Gingerline, one Beaver skin, in season.
One yard Red or Blew Kersey, one Beaver skin, in season.
One yard good Duffels, one Beaver skin, in season.
One yard half broad fine Cotton, one Beaver skin, in season.
Two yards of Cotton, one Beaver skin, in season.
One yard & half of half sticks, one Beaver skin, in season.
Five Pecks Indian Corn, one Beaver skin, in season.
Five Pecks Indian Meal; one Beaver skin, in season.
Four Pecks Peas, one Beaver skin, in season.
Five Pints of Powder, one Beaver skin, in season.
One Pint of Shot, one Beaver skin, in season.
Six Fathom of Tobacco, one Beaver skin, in season.
Fifty Baskets, one Beaver skin, in season.
Ten Pound of Pot, one Beaver skin, in season.
Six Knives, one Beaver skin, in season.
Six Combs, one Beaver skin, in season.
Twenty Scales Thread, one Beaver skin, in season.
One Hat, one Beaver skin, in season.
One Hat with Hubband, three Beaver skins, in season.
Two Pound of large Kettles, one Beaver skin, in season.
One Pound & half of small Kettles, one Beaver skin, in season.
One Shirt, one Beaver skin, in season.
One Shirt with Ruffles, two Beaver skins, in season.
Two Small Axes, one Beaver skin, in season.
Two Small Hoes, one Beaver skin, in season.
Three Dozen mudding Hooks, one Beaver skin, in season.
One Sword Blade, one & half Beaver skin, in season.

What shall be accounted in Value equal
One Beaver in season: viz.

One Otter skin in season, is one Beaver.
One Beem skin in season, is one Beaver.
Two Half skins in season, is one Beaver.
Four Peppercorn skins in season, is one Beaver.
Two Foxes in season, is one Beaver.
Two Woodhocks in season, is one Beaver.
Four Martlets in season, is one Beaver.
Eight Munks in season, is one Beaver.
Five Pounds of Feathers, is one Beaver.
Four Haccoones in season, is one Beaver.
Five Seal skins large, is one Beaver.
One Moose Hide, is two Beavers.
One Pound of Castoreum, is one Beaver.

Exchange table, beaver-skin basis, relating to trade with the Indians
Courtesy of New York Public Library

for goods which were then reshipped to the West Indies or Europe. By 1676 some three hundred small boats in the coastal trade were working out of this port. Even New York and Virginia depended to some degree upon Boston for European goods.

Building little boats led quickly to constructing larger ones. Larger ones, of course, meant ocean voyages and such trips meant foreign trade. In this connection, it is interesting to note that the Massachusetts Bay Company, with its highly restrictive religious qualifications for citizenship,

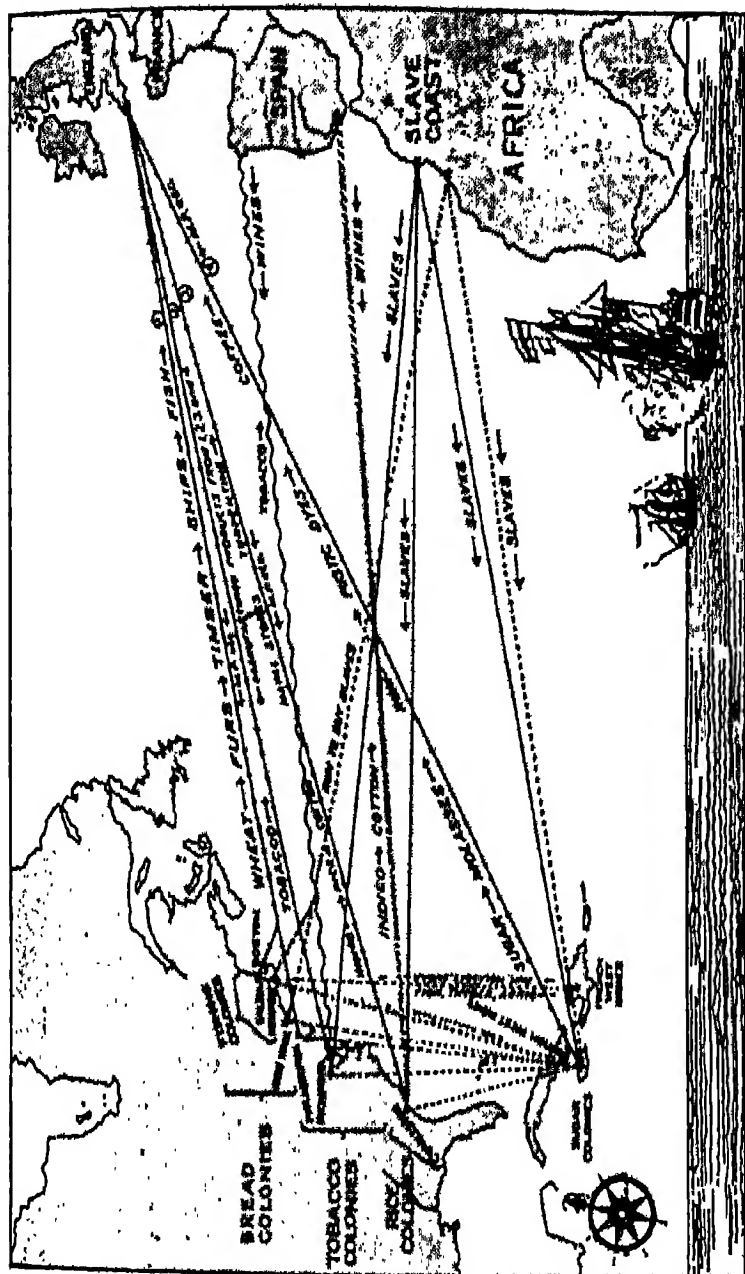
should find that in trade its salvation lay in doing business with Catholic countries. This is another instance of the fundamental universality of business. While these New Englanders had surrounded themselves with rigorous social and religious barriers, their business interests were broad and without inhibitions. Trade has always been at war with bigotry, prejudice, and provincialism.

These early colonists simply followed a basic rule of business: "Find something to sell—then find a market." New England seas were alive with cod, one of the greatest of all food fish. The people of southern Europe and the West Indies required cheap fish that would keep well. The obvious formula to be tried was: cod plus salt plus barrels plus transportation yields Spanish silver plus Portuguese gold. It worked like a charm. The first meager profits only whetted Yankee appetites. Bigger ships were built and the trade was pressed with aggressive vigor. The result was as Captain John Smith had predicted. When they let down their first cod lines they had tapped one of the world's great treasure chests.

In addition to the unlimited store of wealth in fish, these colonists soon discovered another important resource. "The murmuring pines and the hemlocks" not only provided material for shipbuilding but from them the colonists also manufactured casks for their cod and other important items of trade. Masts and spars were shipped to England and pipe staves to wine-producing countries of Europe. The "pipe" was a cask holding about 126 gallons, used for transporting the delectable vintages of Spain, Portugal, Madeira, and the Azores to less fortunate centers. This was an era when men were men, convivial and strong-headed. The flowing bowl held an appreciated and respected place in the scheme of things.

An excellent description of the form which this early commerce took is contained in a report of the voyage of the *Trial*. According to Weeden:

She was the first ship built at Boston—completed in 1642—and Winthrop states her tonnage once at 200 tons, and again at 160. She was commanded by Thomas Coytemore, a gentleman of good estate, who had been a deputy in 1640. . . . His first outward port was Fayal, where he found an "extraordinary good market" for his pipe staves and fish. He took wine, sugar, etc., and sailed for St. Christopher's, in the West Indies, where he traded a part of his wine for cotton, tobacco, etc., and for iron saved by the islanders from wrecked vessels. Under a license from the governor he conducted submarine operations, receiving one half of the property recovered. He worked with a "diving tub," and carried home 50 guns with anchors and cables. He sold a part of his cargo for gold and silver, and the whole result, "through the Lord's blessing," was a good voyage, making wine, sugar, and cotton "very plentiful and cheap."



Principal overseas trade routes of early colonial commerce
From *The Pageant of America*, Copyright Yale University Press

This trip of the little *Trial* to the Azores and the West Indies, three hundred years ago, illustrates the triangular trade-pattern of New England's first foreign business. The route was either to Southern Europe and then to the West Indies or the same course in reverse. It was later so ardently followed that these cod-peddling free-enterprisers almost wore a groove across the Atlantic. There was a regular Puritan parade from Boston to Barbados via Lisbon. The experience and capital acquired in this trade gave to New England its bent for commercial adventure.

In its developed form, this business spread over quite a wide area. Salem, Portsmouth, Providence, New London, and other New England ports all took part. The catch of cod for export was classified into three grades: the first grade for Southern Europe, the second for the Azores and Cape Verde Islands, and the third for the West Indies. In addition, we shipped lumber products, whale oil, corn, peas, beans, and pork. For a time quite a trade developed in horses, many of which were bred around Mattapoisett. They were shipped to be used for power in turning crude cane-sugar mills. Not the least important in the list of exports, however, were the carrying ships themselves. New England shipwrights won an early reputation for good workmanship and low costs. A ship of 100 tons burden, which was a practical size for these short Atlantic routes, might sell for £500.

In exchange for all these products, we brought in salt, sugar, rum, and molasses from the West Indies and wines from the south of Europe. Furthermore, we garnered a supply of both silver coin and mercantile drafts. From a monetary point of view, there was, however, a sad sequel to these accomplishments. Most of the silver and balances thus acquired ended up in the strongboxes of London merchants. This was due to the fact that our forebears needed manufactured goods. London was in effect a great cross-roads store upon which our colonists depended for many necessities and the even more sought-after articles of relative luxury.

As we read of the nature and difficulties of this trade, our admiration for these early businessmen grows apace. This was no child's play. A ship of average size might be anywhere from 75 to 100 ft. long over-all. Except for crude and inaccurate compasses, they ordinarily had no navigating instruments. Before starting on a trading voyage, it was not unusual to get an astrologer to "cast a figure" as to the proper time for weighing anchor. Most of the merchant ships were armed, if not with small cannon at least with muskets and cutlasses for the ship's company. The matter of fighting off pirates or privateers was just part of the day's work and accepted as an ordinary business risk.

The hazards to shipping, even in immediate coastal waters, are illustrated in the following letter from James Logan in Philadelphia to William Penn in London, dated April 1708: "This very week, in four day's time, we had three vessels of this river sunk and burnt. . . . In short, I would advise no man there to send any vessel or goods directly hither, as long as matters stand as they now are, but to take freight for Maryland, under a good Virginia convoy. We have now four English men-of-war upon these coasts, but they very exactly observe the late practice of the navy: that is, carefully to keep out of the enemy's way."⁶

Not only did the master of one of these trading ships have to be ready to fight his way through but he must accept important business responsibilities as well. Owing to the great uncertainties and fluctuations of markets, much discretion was given him as to prices at which to trade, articles to accept in exchange, variations in ports of call, and other matters. He usually had power to sell even his ship if he thought wise. John Hull, for example, wrote to one of his high-sea captains as follows: "I leave it to you from first to last in everything to doe, with vessel and cargo what ever may Conduce in your best judgment for my reale benefit & advantage. Leave noe debts behind you whereever you goe."⁶

In other words, all that was required of these early shipmasters was that they should be able to take their small vessels anywhere without charts or reliable compasses, show their heels in a sailing race with pirates or privateers or fight them off if necessary, manage the business of trading their cargoes and bring home an accounting that would satisfy a gimlet-eyed Yankee owner, whose idea of a fair return on capital was anywhere from one hundred per cent up. Whatever American businessmen have had to do since seems tame and humdrum in comparison!

Even contemporary witnesses found this early success in commerce remarkable:

And first let us look upon *New England*, a Plantation begun thirteen yeares since *Virginia*, viz. in the yeare 1620, the ground no more comparable to *Virginia*, than the North of *Scotland*, is to the South of *England*, they have no Sugar, Indigo, Ginger, or any other of the rich Commodities before spoken of, neither will they grow there; yet in this little time of 28 yeares they are become a flourishing people, and with many gallant Ships built, and every way fitted with materials raised out of their own Countrey; and also laden with their own Native Commodities, drive a Trade with all the World, insomuch as men shall seldome misse passage for *New England* from *London*, once in two Moneths; and by this means, have many fine Towns, and are full of people.⁷

Edward Randolph believed that in 1676 there were at least thirty merchants in Massachusetts estimated to be worth £10,000 to £20,000. He

was also impressed with their skill and initiative in managing their trading ships: "It is the great care of the merchants to keep their ships in constant employ, which makes them try all ports to force a trade, whereby they abound with all sorts of commodities, and Boston may be esteemed the mart town of the West-Indies."

This adventurous game of foreign trade grew expansively through the years. However in the flush of our successes there was not always agreement between the Yankees and Parliament as to just what was cricket. A great deal of the time our merchants completely ignored the Navigation Acts. For instance, we had previously traded freely and quite profitably with Holland. When it was provided that in effect cargoes for Dutch ports must first be cleared through England, the regulation was honored mostly in the breach. The Dutch being excellent customers of ours, we had little sentiment for England's traditional policy of crippling their trade.

Similarly, smuggling goods into our own ports to avoid payment of the King's duties carried no stigma. Its successful accomplishment seemed just a good joke on the representatives of the Crown. On one occasion a gouty and plethoric Collector of Customs was detained in a pest house and subjected to a thorough fumigation while, almost within earshot, one of our merchantmen was unloading a large cargo of dutiable merchandise.

But evasion of the Navigation Acts was not the only phase of this trade game that we played according to our own rules. For many years there was carried on a highly profitable business with pirates on the high seas. These gentlemen of cut-throat tendencies would seize a merchantman in the West Indies. The problem would then be to realize on her cargo. This was frequently solved by putting into the eastern end of Long Island Sound where Yankee merchant ships would meet the buccaneers. Goods would be purchased on such a basis as to permit perhaps a two or three hundred per cent profit when disposed of in Boston, New London, Newport, Portsmouth, or New York.

As this nearby source of stolen goods was not always dependable, the resourceful New England merchants evolved a more reliable procedure. Having visited the West Indies and Azores, their ships would slide down the coast of Africa and around the Cape of Good Hope to Madagascar. This great island was a sort of buccaneers' general headquarters and playground. Here many of the sea rovers maintained small strongholds and stores of rich booty. Here they caroused and regaled themselves after the arduous work of running down East Indiamen laden with the treasures of the East. It was a strategic point, far from ports of the King's Navy, yet so situated that a hard-working pirate could get back to business on Monday morning without undue loss of time. And it was here that our

Yankee merchant shippers would come when they wished to secure a cargo which would net a particularly juicy profit. It sounds like finding money until one runs across an item such as the following from Felt's *Annals of Salem*: "The Turks have soe taken our New England ships richly loaden homeward bound, yt itt is vary dangerous to goe [i.e. to England]. Many of our neighbours are now in captivity in Argeer [Algiers]. The Lord find out some way for yr redemption."⁹

Of course even better than buying stolen goods was the plan of acquiring them directly. This, as it were, eliminated the middleman. To fit out and arm privately owned merchant vessels for the purpose of harassing enemy commerce was in those days a perfectly legitimate method of warfare. All kinds of people participated in it and, once out upon the high seas, some of these privateer-skippers were not overscrupulous in restricting their activities to enemy ships. The line between privateering and pirateering was, in the minds of some of the more rugged individualists, conveniently adjustable. In a manner of speaking, this business of privateering was looked upon by some as an adventurous form of outdoor sport as the following advertisement from the *Boston News Letter* of the year 1704 shows:

"Capt. Peter Lawrence is going a privateering from Rhode Island in a good sloop about 60 Tuns, and any Gentleman or Sailors that are disposed to go shall be kindly entertained."¹⁰

In dividing the proceeds of a capture, the owner of a privateer frequently took one half of the prize money, the master and crew getting the balance. A sizable volume of domestic trade arose from the subsequent disposition of seized cargos through ordinary commercial channels. Merchants looked upon the practice as simply another way of doing business. The system strengthened the sinews of trade when war interrupted the normal exchange of goods. Boston, as a more sophisticated metropolis, did not take to this field as enthusiastically as Salem, Providence, and New York.

While foreign commerce grew apace in these early Colonial years, the development of the whaling business proceeded more slowly. It is probable that it started along the sandy beaches of eastern Long Island in the second quarter of the seventeenth century. The first form it took was simply the reclamation of oil and bone from stranded right whales. Then small boats manned with oars would put out along the shore with the hope of driving an iron into one of these big fellows which abounded in the shoal waters off Long Island and Cape Cod. In those earliest days of whale killing it was customary for each community to maintain watches along the beaches for whales coming in close to shore. High posts were erected, on top of which, in all kinds of weather, sat the lookouts. When the call

was given all hands would take to the small boats in pursuit. Indians went along with the whites and were much esteemed for their prowess.

The colonists at Plymouth took up the business and did well at it. In January, 1687, Edward Randolph at Boston wrote to England as follows: "Since the governor's arrivall New Plimouth colony have great profit by whale killing: I believe they will have nigh 200 tons for to send to England, and will be one of our best returns, now beaver and peltry fayles us."¹¹

In 1708 we find Lord Cornbury writing to the Board of Trade that on Long Island alone four thousand barrels of whale oil had been recovered in one year. Whale oil was in great demand in England and gave the colonists a much-needed item to export directly to the mother country.

Although Nantucket had early established herself as the leading whaling center, it was not until 1712 that the first sperm whale, killed by the crew of a sloop blown well off shore, was brought into her harbour. This was the beginning of the famous whaling era. From then on vessels became larger and cruises longer. The oil of the sperm whale was better and the spermaceti of its cranial cavity unexcelled as a wax for candles. This business grew rapidly in the last few years before the Revolution and by 1775 Nantucket had around 150 vessels so engaged. During the Revolution, English men-of-war and privateers drove our whalers from the high seas but shortly thereafter the enterprise got under way again to reach the flood tide of its prosperity in the middle of the nineteenth century when New Bedford and Nantucket ships were scouring the seas on voyages lasting up to three years.

In whaling, as in cod fishing, there was not only profit sharing but a broad community of interest in the whole affair. The "lay" system provided that the master of the ship and each member of the crew should share with the owner in the success of every cruise. As the little whale boats crept up on the hulking monsters, each one of the crew could make a quick estimate of just how much his profit would be if the harpoon struck aright.

Another famous salt-water adventure of the colonists was the slave trade. This business was not an enterprise of colonial origin but was adapted from English practice. For many years, until terminated in 1698, the Royal African Company of London enjoyed a monopoly in the slave trade from the Gold Coast of Africa to the West Indies. In 1695 slaving was considered one of the most profitable of English commercial adventures.

The pattern of our slave trade was simple. Second- or third-grade cod was sent to the West Indies, as food for the plantation workers, to be exchanged for molasses. Molasses was brought to New England and distilled into rum; rum was taken to the Gold Coast of Africa and traded for

slaves; slaves were taken to the West Indies to be exchanged for more molasses, plus perhaps sugar, cocoa, or silver coin. A few slaves were brought to New England and used for personal or household servants. It was not until well after 1700 that Virginia, Carolina, and Georgia became important markets.

In this slave trade, Newport, Rhode Island, was the center of greatest activity. Sailing into this picturesque harbor came a procession of ships, laden with molasses from the West Indies. Outward bound they would be low in the water with great hogsheads of rum for the Guinea coast. Newport became a boom town in the period from 1700 to 1760. At one time twenty-two distilleries operated there and even with this production demand exceeded supply. In this period it is estimated that Newport sent on

	Just imported from Africa, by Capt. RICHARDS and now on board his Sloop at Coen- ties's-Dock, a parcel of very fine young healthy	
<h1>SLAVES,</h1>		
To be sold by HENRY C. BOGART, next Door to Mr. John Vanderpiegle.----He has also Molasses For Sale.		

Advertisement in the *New York Mercury* of June 24, 1765

an average eighteen vessels a year to the Gold Coast. This commerce was sufficient to permit Rhode Island to make yearly trade remittances to Great Britain of £40,000, a tidy sum for those days.¹² Other colonies besides Rhode Island, of course, participated in the slave trade and although this was not the most important field of commerce, it was for a number of years undoubtedly highly profitable.

So it was that New England's foreign trade developed down to the Revolution. Its growth was marked by periods of ebb and flood as wars, privateering, Navigation Acts, expansion and saturation of markets alternately disturbed or fostered commerce. As their experience grew, our merchants constantly pressed to more distant trade areas. In the second half of the eighteenth century this colonial economy began to take on some aspects of maturity. Sizable amounts of capital had been built up by many merchants.

It was truly a democratic capitalist economy. The base was so broad it took in all. Any person could acquire and work land for his own account. In fishing and foreign commerce there existed similar opportunities for

proprietorship. The youngest and greenest hands on the cod lines received a percentage of the catch. They shared the profits as well as the risks. Likewise in the long hazardous trading voyages to Europe and the West Indies, many persons partook in the profit possibilities of each cargo. Anyone who had saved a few hundred dollars could send out his own argosy in the shape of some barrels of cod or a few bundles of pipe staves. The community of interest was real. Trade was of the very fiber of the people.

Too little credit has been given New England for the dynamic quality of its capitalism. It was not sufficient for the Yankee to save, although he did that with perhaps some absence of restraint. He must as well adventure with his capital. He must send it out into trade with the hope of increasing it. This was a dominant characteristic of colonial New Englanders. The accumulation of capital built not only a colony but a worldwide trading system. Later New England's merchant capital helped to finance the growth of the new nation. Profits from ventures to the West Indies, and later in the China trade, were to furnish capital for building our textile industry, constructing our railroads, and opening up the great copper mines of the west.

IV.

MANUFACTURING

Ships, Shoes, and Slitting Mills

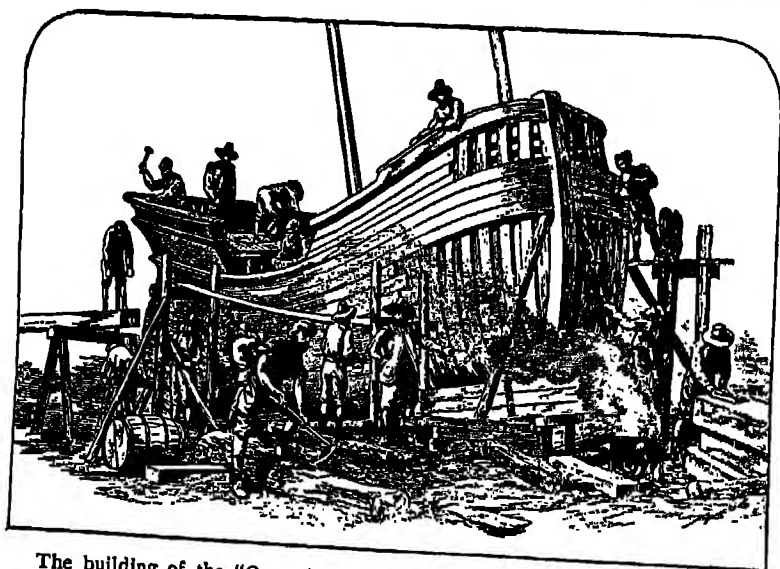
THE trend of business, of course, follows the line of least resistance. Therefore in the colonies trade and commerce were favored over manufacturing. A frontier civilization does not become industrial overnight. Capital must be accumulated, skills acquired, supplies of labor provided, and markets developed. Furthermore in the case of the colonies not only did all this have to be done but also the active opposition of the Home Government and the Lords of Trade had to be circumvented. It is not surprising, therefore, that up to the time of the Revolution our manufacturing industries were small and few. Shipbuilding was the leading one. Also there was a sizable household production of clothing and shoes. Flour milling had made a real start. Our hatmakers were doing well. We were producing iron in moderate quantities.

Shipbuilding commenced almost as soon as the first colonists got ashore. In this industry we see fulfillment of Ellsworth Huntington's theory of the "Fortunate Middle Latitudes." The mixed forests of hard and soft wood of New England offered everything the shipbuilder needed: white oak for ship frames—their crotches for the vitally important knees and angles for joining frame and stem with keel—and long straight white pine for masts and spars, in addition to rosin, turpentine, and tar from the distillation of pine sap. It was necessary during most of the colonial period to import iron parts, sails, and cordage for the final rigging of the ships. Nevertheless with so much excellent raw material readily at hand New Englanders could pay relatively high wages to shipwrights and yet produce ships more cheaply than their competitors in England.

The division of labor was well advanced in this industry. It has been estimated that some thirty different types of merchants and artisans were involved in building the larger ships. Although shipbuilding was the most

highly developed colonial manufacture, little cash changed hands. Masters and workmen were content to secure the necessities of living plus a little credit. Specie of all kinds was so scarce that internal business had to get along partly by barter.

In manufacturing, perhaps the most interesting development of the early colonial period in New England was the production of iron. About 1643 attention had been called to ferric deposits lying in the beds of certain ponds, principally around Lynn, Massachusetts. This was an oxide



The building of the "Onrust" or "Restless" by Adrian Block on Manhattan Island about 1614. It was in this craft that Block explored Long Island Sound, and the island which now bears his name.

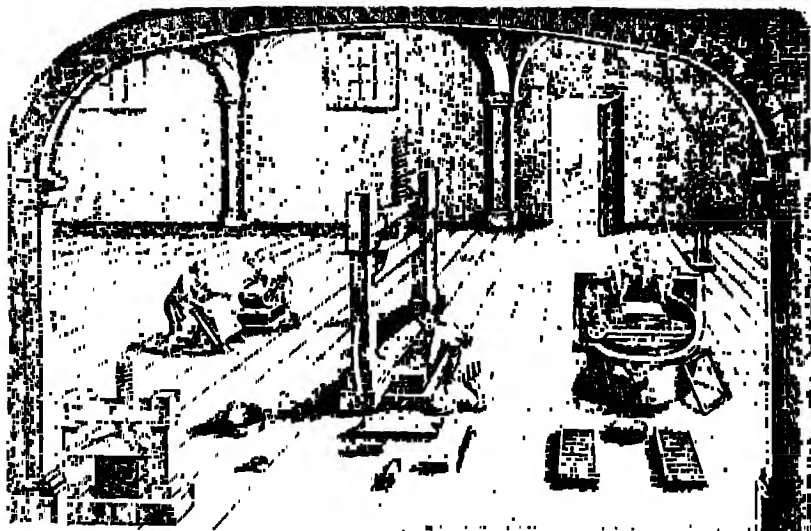
Culver Service

or sesquioxide of iron which lay mixed with vegetable mold as a partially solidified mass at the bottom of ponds and bogs. Samples sent to England aroused much interest. And at this point one of New England's most colorful sons came into the picture as promoter and industrialist. John Winthrop, Jr., son of Governor John Winthrop of Massachusetts Bay, organized a company in London for the purpose of making iron from "bog ore." Some of our modern investment bankers might wish to note that this new enterprise was referred to as a "Company of Undertakers for the Iron Works." Its capital was £1,000.

Young Winthrop got together a modest amount of equipment and some English workmen skilled in ironmaking. These were brought to Massa-

chusetts and a plant set up at Braintree. The project was successful from the start and a quantity of "sow" iron was produced. In 1644 a charter was granted by the General Court which also bestowed upon the company a concession of land and other privileges. Additional capital was required in order to complete a forge. Towns were offered a chance to subscribe. The "undertakers" stated that payment could be made in almost any commodity which the workmen could use.

The operation was roughly as follows: men with spoonlike shovels dug up the bog muck; this was smelted, charcoal being used as fuel and sea



View of early hand-process of paper making

The Growth of Industrial Art, Benj. Butterworth, United States Patent Office

shells as flux; draft for the furnace was provided by a crude bellows operated by a water wheel. After grist mills and saw mills, this was one of the first applications of power to an industrial purpose. Also, as far as is known, this was the first company promoted and partly financed by the colonists although even in this instance the original capital came from England. The success of the Winthrop venture was a good omen of the industrial development which lay ahead. Shortly afterwards other iron furnaces were successfully operating at Saugus and Taunton, Massachusetts, at New Haven, Connecticut, and in Rhode Island.

To those who are interested in qualities of initiative and imagination, this John Winthrop Jr. is a man with an appealing character. He might

be called America's first industrialist, not simply because of the priority of his accomplishments but also by reason of possessing those characteristics which have contributed so much to American triumphs in the field of manufacture.

To stand in reflected glory as the son of the great Governor of Massachusetts Bay was not enough for young Winthrop. After promoting his ironworks at Lynn, he embarked upon other ventures. He brought the first chemical laboratory to America and collected the best scientific books. These are now the prized possession of the New York Society Library. He founded a saltworks near Boston. Later he successfully produced potash, saltpeter, alum, woodpitch, and tar. At New Haven he set up an iron foundry and glassworks. He was in at the start of two of America's great industries, ironmaking and the manufacturing of chemical products. Winthrop used the following advertisement in promoting one of his chemical projects:

If any desirous to promote a publique good shall see cause to accomodate that businesse with a stock of 3000 £ or 4000 £ I shall indeavour (God permitting) to raise such commoditee as may be convenient for returnes, and in particular that staple salt-petre of which some — of tunes are yearly carried into England, Holland, Portugall and other parts; and that no adventure of detriment may be to any, due hereby ingage that the said stock shalbe within — yeares duly repaied to them, with some convenient consideration (if God please to add a blessing to the designes so farre as it be profitably effected); and when it shall appeare demonstratively incouraging, they may, if they please to joyne in the business and to a further proceeding, advance to a stock of 10,000 to 20,000 £ or more.¹

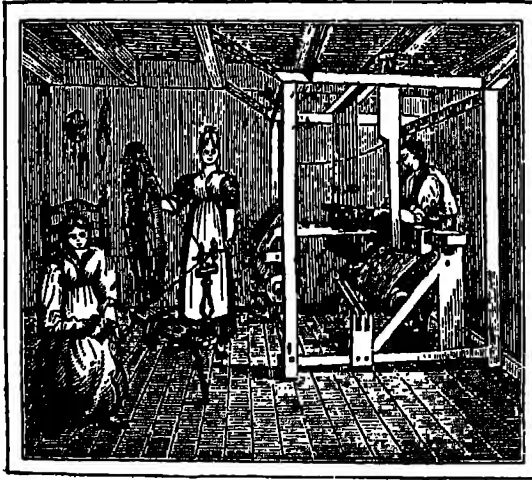
Surely it must be admitted that John Winthrop Jr. set an excellent precedent in company promotion and stock selling. If the project succeeded, he was going to reward the stockholders by letting them put in more capitall

Considering the limited supply of workable bog-iron deposits, it was fortunate that in the first half of the eighteenth century many bodies of iron ore were also discovered. Mines were opened in Virginia, Connecticut, New Jersey, Pennsylvania, Maryland, and New York.

In New Jersey the ore was mined in the Jersey Highlands and carried on pack horses to Whippany on the Passaic River. Here it was smelted into bar iron and then transported again by horse to Newark. Much of it was shipped to England where it brought £20 per ton.

This business of producing pig and bar iron met with great favor in England, which each year was forced to import substantial amounts of

Swedish iron. In 1750 duties on colonial iron were removed but it was provided that the colonists should not erect new plants for rolling or slitting iron sheets. This prohibition acted as a serious blow to the growth of an industry which was just getting started. The colonists already had several such mills, and regarded this action as a high-handed, unwarranted interference by the home government in colonial affairs. It contributed to the political disturbance which lay ahead.



The manufacture of cloth

Popular Technology or Professions and Trades,
Edward Hazen

Much of the product of these little rolling and slitting mills—or in reality workshops—found its way into domestic production. The farmer would trade produce for some of these iron strips. Then at night, or when unable to work out of doors, he and his sons would make nails around the family hearth.

More extensive than nail-making, of course, was the production of cloth. Starting not later than 1640 this continued for over a century and a half almost entirely as a household occupation. Each member of the family would take some part in carding and spinning the yarn and then weaving it into homespun. Frequently the actual weaving would be done by itinerant weavers. In some sections fulling mills were operated on a toll basis to dress the cloth which had been woven in the homes. Production grew steadily and attained a sizable volume by the middle of the eighteenth century.

That this domestic production of cloth was looked upon with something

less than equanimity by the representatives of the Crown is attested in the following report by Lord Cornbury, Governor of New York (1702-1708), to the Board of Trade in London:

I am well informed, that upon Long Island and Connecticut, they are setting up a Woollen Manufacture, and I myself have seen Serge made upon Long Island that any man may wear . . . how farr this will be for the service of England I submit to better Judgments; but however I hope I may be pardoned if I declare my opinion to be, that all these Colloneys which are but twigs belonging to the Main Tree (England) ought to be Kept entirely dependent upon & subservient to England, and that can never be if they are suffered to goe on in the notions they have, that as they are Englishmen, soe they may set up the same manufacture here as people may do in England; for the consequence will be that if once they can cloath themselves, not only comfortably but handsomely too, without the help of England, they who are already not very fond of submitting to Government would soon think of putting in Execution designs they have long harboured in their breasts. This will not seem strange when you consider what sort of people this Country is inhabited by.²

In the case of shoemaking, the domestic system was well advanced. Many New England families made shoes in their spare time and then sold them to merchants. Even today on some old New England farms are small separate workhouses formerly used as family shops for making shoes. In New Haven, as early as 1647, we also find the practice of a merchant supplying the leather and thread to the home shoemaker who would be paid on a piece basis for his finished product. Massachusetts and Connecticut exported shoes to the other colonies.

We have already noted how beaver pelts contributed to the money supply and foreign exchange of the colonists. They were also used in manufacturing. Beaver hats not only provided a good head covering but were also regarded as a mark of social distinction. With a plentiful supply of beaver on hand, it was natural that a demand for this mark of superior station should result in the colonists developing a hatmaking industry. The business succeeded well and by 1731 it was estimated that New England and New York were producing around 10,000 hats each year. Furthermore these enterprising little manufacturers succeeded in establishing an active export trade. In 1731 the London Board of Trade reported that: "Great quantities of hats are made in New-England, of which the company of hatters in London have complained to us, that great quantities of these hats are exported to Spain, Portugal, and our West-India Islands."³

Shortly after this report, Parliament forbade the export of hats from the colonies under penalty of heavy fines. This was a hard blow to the New

England hatmakers and almost ruined their thriving little industry. Here again we witness another economic conflict with the mother country.

There were, of course, other manufacturing occupations in which the colonists made a satisfactory beginning. Sawmills operated by water power were started as early as 1631. This was one field in which the colonists got the jump on the old country. On account of the prejudice of English handsawing labor, sawmills were not used to any extent in the mother country until late in the seventeenth century. That the enterprising pioneers in America were quick to adopt this simple application of power contributed materially to their success in shipbuilding.

Gristmills, of course, were in every sizable community. Some of these were operated by "tide mills," a form of power that did not prove to be as practicable as the more usual type of waterpower. The manufacture of paper was started about 1690. A little later edged tools and guns were turned out in small quantities. Powder was also manufactured. Bricks and glass were made even in the early period.

Except for the building of ships, all these manufacturing pursuits were on a small scale. Nevertheless the colonists had made a start on a relatively broad front. Not only were they filling many of their own requirements but they had even begun to export manufactured goods. These small successes stimulated high expectations. Our people began to experience a sense of accomplishment and to vision a promising destiny. Hence doubly bitter was their resentment at English regulations which denied them progress and stifled initiative. They had no content in being "but twigs belonging to the Main Tree." They were looking toward broader horizons.

V.

TRADE FOSTERS FREEDOM

ATTEMPTS to appraise the relative importance of the causes which brought on the American Revolution have provoked almost as much conflict as did the rebellion itself. Fortunately, historians do not go armed. In any case, the subject is a broad one involving considerations both economic and political. The basic forces at work were those of evolution. The real changes were wrought over a period of a century rather than of a decade or so.

If one were to trace the taproots of our difficulties with the mother country, it might be found that they derived from differences of environment. In conquering the rugged frontier of our Atlantic seaboard our people developed qualities of resourcefulness, independence, and sufficiency that called first for economic and then for political self-expression.

A separation of three thousand miles of ocean made for two different worlds. The transplanted Englishman, after a few years face to face with the facts of life in the colonies, became a different critter. In fact, to Parliament and the Lords of Trade, he turned into a problem child.

Of course there were other things beside environment. Even at home, by the end of the seventeenth century, ideas of government were receiving a new interpretation. The colonists brought with them liberal thoughts about the rights of English citizens. Thus the minds of these frontiersmen were fertile for ideas of expanding freedom. The environment of the New World provided the climate for a rich harvest.

These were positive forces. But there was a negative one, destined to contribute mightily to a division between these two breeds of Englishmen and second to none in importance. This was the philosophy of government which, as we have already noted, dominated England and Europe during those years—mercantilism.

This point of view placed the colonies in a definitely subordinate role. They were looked upon as suppliers of only those raw materials and agricultural products which would benefit the English economy. They were

called "plantations" and that was what they were meant to be. Their trade should serve solely to supplement that of the home country. Picturesque expression of this attitude was the declaration that "All plantations en-damage their mother kingdom, where the trades of such plantations are not confined to the mother kingdom by good Laws and a severe execution of them."¹

Into this mercantilist framework the different colonies fitted with varying success. Those of the south became the chosen people of the Lords of Trade. Especially did Virginia and Maryland behave as model plantations. They confined themselves largely to tobacco, a crop which English merchants turned to profitable account.

The middle colonies, Pennsylvania, Delaware, New Jersey, and New York, behaved less well. While they remitted a supply of wheat, fur, and lumber to the home country, they also evinced a roving eye for the profits to be made in foreign trade, especially that with the West Indies.

But it was New England that really broke a fond mother's heart. These Yankee forebears of ours had landed on a rugged terrain. They could grow no crop like tobacco. In seeking to improve their standard of living they had been driven into an active commerce with foreign nations and customers not amenable to British control. Well it has been said of them that ". . . their commerce smelled as strongly of fish as their theology did of brimstone."²

As the years rolled on, this clash of interests bred increasing friction. Mercantilist policies were invoked largely for the benefit of English businessmen by a government which to a substantial degree they controlled. Yankee merchants found this system galling and sought freedom of trade. Reduced to a perhaps undue simplification, the division between the colonies and the mother country in its early phases was a conflict between businessmen in London and those in Boston and New York.

The means by which the Lords of Trade and Parliament sought to control colonial commerce in the interest of English businessmen took the form of a series of Navigation and Trade Acts. Their enactment spread over more than a century before their accumulated effect was such as to lead to outright rebellion.

The first of these was one which touched the colonists but lightly, the Navigation Act of 1651. It was typically mercantilist in its effort to foster English and colonial trade at the expense of the Dutch. All goods of Asia, America, and Africa must thereafter come to England and her colonies only in ships of which the owner, master, and most of the mariners were English subjects. Similarly, all European products could only be imported into England or her colonies in this same way or by ships belonging to

the country of origin. From the colonists' point of view, these regulations were not onerous because in a measure colonial merchants benefited and were left free to trade with the Spanish and French West Indies, southern Europe, and even the Dutch.

But in 1660 came an Act of different tenor. England had begun to apply the screws. After renewing the provisions of the previous Act, this one applied added restrictions, among which were the following:

- A. All products imported into *or exported* from the British possessions of Asia, Africa and America must be conveyed in English or colonial ships.
- B. certain enumerated products—tobacco being one—were to be exported from the colonies only to England, Ireland, Wales, or other English colonies.

To this was added, in 1663, the famous Staple Act, really quite an ambitious concept, even for those self-effacing English merchants. It was nothing less than an attempt to lay their hands on and secure a profit from all European merchandise moving to the colonies. Such goods must first come to England or Wales and then be reshipped in English vessels. Obviously this was an attempt to create a monopoly for the British. It struck particularly at colonial trade with the Dutch. Obedience to such regulation by our colonists meant giving up profitable overseas commerce. In their rugged individualism New England merchants did not stampede to this sacrifice. They decided graciously to overlook this most unfortunate blunder of the Lords of Trade and set about circumventing the law. Smuggling became part of the established order. With the assistance of Dutch ships, and even some from England, colonial merchants outwitted the King's minions with illicit traffic. Mercantilism began to show signs of strain.

Thenceforward Parliament sought sporadically to bring growing colonial business into line with the desires of English manufacturers. In 1699 the Wool Act forbade the colonists to export wool or woollen products. In 1732 a similar prohibition applied to beaver hats. One year later an attempt was made to control the molasses trade. The Iron Act of 1750 prohibited the construction in the colonies of any new slitting or rolling mills. Then with a jaundiced eye on New England's monetary adventures, which it must be admitted were far from exemplary, Parliament forbade the issuance of further bills of credit or attempts at making them legal tender.

The end of the Seven Years' War in 1763 brought marked changes to both England and the colonies. The mother country became empire-minded and began to think of a more effective organization of her relation-



By the HONOURABLE

JAMES HAMILTON, Esq;

Lieutenant Governor, and Commander in Chief, of the Province of
Pennsylvania, and Counties of *Newcastle, Kent and Sussex*, on
Delaware,

A PROCLAMATION.

WHEREAS by an Act of Parliament, passed in the Twenty-third Year of His Majesty's Reign, entitled, *An Act to encourage the Importation of Pig and Bar Iron from His Majesty's Colonies in America, and to prevent the Erecting of any Mill, or other Engine, for smelting or rolling of Iron, or any plating Forge to work with a Tilt Hammer, or any Furnace for making Steel, in any of the said Colonies*; it is enacted, "That from and after the Twenty-fourth Day of June, in the Year of our Lord One Thousand Seven Hundred and Fifty, every Governor, Lieutenant Governor, and Commander in Chief, of any of His Majesty's Colonies in America, shall forthwith transmit to the Commissioners for Trade and Plantations, a Certificate under his Hand and Seal of Office, containing a particular Account of every Mill or Engine for smelting and rolling of Iron, and every plating Forge to work with a Tilt Hammer, and every Furnace for making Steel, at the Time of the Commencement of this Act, erected in his Colony; expressing also in the said Certificate such of them as are used, and the Name or Names of the Proprietor or Proprietors of each such Mill, Engine, Forge and Furnace, and the Place where each such Mill, Engine, Forge and Furnace, is erected, and the Number of Engines, Forges and Furnaces, in the said Colony." To the End therefore

GIVEN under my Hand, and the Great Seal of the Province of Pennsylvania, at Philadelphia, this Sixteenth Day of August, in the Twenty-fourth Year of the Reign of our Sovereign Lord GEORGE the Second, King of Great-Britain, France and Ireland, &c. and in the Year of our Lord, 1750.

By His HONOUR's Command,
RICHARD PETERI, Secretary

JAMES HAMILTON.

GOD Save the KING.

PHILADELPHIA: Printed by B. FRANKLIN, Printer to the Province. B10CUL.

Proclamation of 1750 forbidding colonists to erect new mills for making iron and steel products

From *The Pageant of America*, copyright Yale University Press

ship with her colonies. Heavily in debt, the British government sought tax revenues to support the expenses of colonial administration and defense. It has been estimated that theretofore custom duties secured by England in the colonies yielded only a pittance of £2000 per year and cost almost four times that much to collect.

In order to secure revenue, Parliament passed the Sugar Act in 1764

and the Stamp Act in 1765. The former, a revenue and trade measure, reduced the duty on foreign molasses coming into the colonies from 6d to 3d per gallon—ordinarily a move that would call for rejoicing. That it did not in this case was due to the fact that the 6d levy had been evaded but it now became apparent that Crown officials would make sure to collect the new one. This would be a serious blow to that portion of our commerce in which rum was a staple. Other duties were also imposed and procedures were tightened up over a wide field further to channel our overseas trade through England. The Stamp Act was an internal impost upon a wide range of legal and commercial documents as well as newspapers and advertisements. It imposed heavy fines and forfeitures for evasions.

These new laws caused a furore of resentment. The intensity of feeling was in great measure occasioned by the fact that the impact of these taxes struck on raw flesh. They were to be collected in specie. But hard money was already hard to come by, owing both to the business depression which followed the end of the War in 1763 and the perennial flight of silver to England to pay for imports.

If British legislators had counseled as to how most effectively to irritate and arouse a people they could not have done better—or worse—than the Stamp Act. It struck particularly at those elements in the colonies which most directly controlled public opinion—merchants, lawyers, and the press. These at once hit back through a series of moves which set off a mighty powder train. Meetings were held, pamphlets written, and associations formed. Even "The maids of Providence and Bristol displayed the extent of their resolution by bravely agreeing to admit the addresses of no men who favored the Stamp Act."^a

Smarting under the impact of the Sugar and Stamp Acts our colonial businessmen now decided that the situation called for action that would really make itself felt. Groups of merchants got together in Massachusetts, New York, Pennsylvania, and Rhode Island and agreed that they would import no more English merchandise until the Stamp Act was repealed. British merchants and manufacturers were hard hit and in turn hit hard at Parliament. Promptly the Stamp Act was repealed and the Sugar Act amended. The economic boycott had won a signal victory.

Resentment of Acts of Parliament, which had been growing over generations, had now assumed significantly different characteristics. The colonists began to think of their relationship to the mother country as posing a common problem. "In view of the later revolutionary movement, it is not too much to say that the Stamp Act derived its chief importance from the fact that it lifted the controversy from the profit-and-loss considerations of the northern colonists and furnished a common ground on which the

planting provinces might join with the commercial provinces in protest." 4 Nine colonies sent representatives to the Stamp Act Congress in New York in October, 1765. Almost imperceptibly the forces toward a union of the colonies were growing in importance.

Although a mutuality of interest was thus drawing the colonists together, a division was also taking place along what in reality were party lines. This split occurred not on the direct issue of whether to oppose oppressive English statutes but rather on the extent and range of such opposition. Colonial merchants had been responsible for starting organized public action. Quickly, however, other groups of more democratic make-up were formed, such as the Sons of Liberty, stirred by political rather than economic concepts. Slogans like "No taxation without representation" became potent forces.

No Stamped Paper to be had. *November 7, 1765*

An early twist applied to the British Lion's tail. Headline which ran for some weeks on first page of the *New York Mercury*, 1765. The colonists themselves had seen well to it that there were no stamps to be had.

These new groups comprised the liberal or radical wing of the movement against the mother country. Merchants and planters constituted the conservative one. Nevertheless lines of distinction were ill-defined and various economic interests were represented in both parties. While the radicals were violent bitter-enders, the merchant class, after having attained important concessions, was disposed to compromise and get along somehow or other. "Even Franklin had once championed expediency, when he bade the colonists, 'Manufacture as much as possible and say nothing.'"

Meanwhile Parliament continued in its career of ill-considered legislation. In 1767 the Townshend Acts were passed. These levied new duties on colonial imports—including one on tea—and sought a more effective enforcement of all revenue laws. As a disciplinary measure the New York Assembly was suspended.

Boston merchants now took the lead in calling for a widespread renewal of nonimportation agreements. By the summer of 1769 leading businessmen in the port cities and planters in the south joined the movement. Active in promoting an association for nonimportation in Virginia was George Washington. While the efficacy of these accords varied with the intensity of feeling in different communities, in New England British importations fell off about 50 per cent. These events once more spoke a lan-

guage readily understandable to English businessmen. Again their influence in Parliament was successful. The Townshend Acts were repealed except for the duty on tea, and the economic boycott had won the second round. Being in large measure victorious, the nonimportation organizations fell apart.

Following this achievement there ensued three years of calm and rising prosperity for the colonists. High hopes were entertained that a new era of amicable relations with the mother country had been attained. These were brutally dashed, however, when in the spring of 1773 Parliament, still pursuing a mercantilist policy, took action that stirred to white heat the slumbering embers of resentment. All in all it was a remarkable proceeding. Basically it was in the nature of a rescue effort to relieve the distress of England's most renowned trading corporation.

The venerable East India Company had come upon hard times. For several years its affairs had given concern and by 1773 they were in such a state that in order to prevent outright bankruptcy Parliament was forced to take radical measures. The company's annual dues to the government were remitted and a large loan from the public exchequer granted.

Then came the disastrous action. The company was staggering under the burden of a heavy inventory of tea. Looking to a solution of this problem Parliament granted it permission to sell tea directly in the American market. This short-circuited English merchants as well as colonial—except for a privileged few who were to act as agents of the East India Company.

Now an extraordinary thing happened. Although by this procedure tea could be sold even cheaper to consumers in the colonies than when smuggled in, by our sturdy forebears, the proposition found no friends. In fact public opinion was outraged. The issue served to bring together conservative and radical elements and unite our people as never before. No wonder Parliament had difficulty in its American public relations!

The merchant class saw what they thought was an ominous writing on the wall. If Parliament granted one trading monopoly in the colonies, it would surely create others. That of course would mean turning domestic American business over to English merchants. The prospect was not to be endured. John Hancock held up the specter of some huge English company purchasing the exclusive right to all trading in the colonies. In Philadelphia John Dickinson urged the night watch as he made his rounds to proclaim "Beware of the East India Company."

For the planters and the masses the issue now became almost wholly political. Tea might be cheaper but it still paid a duty and was to be purveyed by an English monopoly. The assertion of such prerogatives by

Parliament was regarded as an omen of its intention to intervene in and control colonial fiscal and administrative matters. The right of self-government was at stake. Thenceforth thoughts of political freedom overrode economic considerations, to provide the final impetus which drove our people along a road that ended in rebellion.

Events were rushing rapidly to a climax. When the East India Company's tea reached New York and Philadelphia it was unceremoniously sent back overseas. In a dramatic escapade some exuberant citizens of Boston dumped their shipment into the bay. Parliament reacted vigorously and in 1774 passed the "Intolerable Acts" which among other things closed the Port of Boston, repressed town meetings, and posted more troops in that city.

The great majority of the colonists were now aroused. Demand for united action became widespread and resulted in the meeting of the first Continental Congress in September of 1774 at Philadelphia. While its members differed markedly among themselves, a common agreement was reached. A declaration was drawn up setting forth the political principles which the colonists avowed and a petition was addressed to George III. More important, the Congress had recourse to the weapon which had previously been so successful—the economic boycott. The Continental Association was formed to carry out this plan over an extensive front and mobilize local committees for action. All colonies except Georgia joined. An effective job was done, and at times the activities of local enforcement groups were violent and destructive. British exports to the colonies fell from £2,600,000 in 1774 to about £200,000 in 1775.

But this time Parliament turned a deaf ear to the pleas of English and Scotch merchants whose trade had been hit. The Mother of Parliaments was irked. Lord North declared: "If the Americans refuse to trade with Great Britain they shall trade nowhere else." The rod was not spared. By the Prohibitory Act of 1775 all the colonies were forbidden to trade with any country except Great Britain and their ships declared liable to seizure for breach of this law.

The final tide had set. Parliament was unyielding and bent on so-called disciplinary measures. But such action only brought increased resistance. More vigorous use of troops by the British was sure to lead to bloodshed. It was not long in coming. The skirmish at Lexington and Concord set off the fuse.

Thus it was a changed Continental Congress which met in its second session a few weeks later in April, 1775, at Philadelphia. Unfolding events had legitimized the radical cause, now gaining adherents from all classes and sections. The middle-of-the-roaders and those of soft counsel were

in disrepute. Centripetal forces were at work, uniting the colonists in common cause. The long-cherished weapon, the economic boycott, suddenly seemed impotent. Overriding now were thoughts of military mobilization and a common armed defense.

All eyes centered on Massachusetts, the focal point of colonial resistance. From far and wide farmers, artisans, and tradesmen seized their flintlocks to join the mushrooming militia companies. Support of this rawboned, hodgepodge army raised serious questions of supply and finance. Massachusetts petitioned Congress for aid.

It was proposed that Congress take over the Massachusetts militia and appoint a New Englander to assume command. Other colonies jealously protested. Southern planter delegates were particularly aroused. Politics and the human equation are forever present even in our greatest moments. The situation was resolved by a political compromise. The troops in Massachusetts became a federal army under the direction of Congress. A Virginia planter, George Washington, was named General and Commander-in-Chief in June, 1775.

The desire for independence, so far largely inchoate, had begun to take tangible form. It still, however, lacked coalescence of public opinion. The needs of the times beget the leaders of the times. A great spokesman now arose in the person of Thomas Paine. In his tract *Common Sense*, which ran up the then fabulous circulation of 100,000 copies, Paine called his countrymen to rebellion. This was the catalyst which united our people. The movement became irresistible. The last feelings for reconciliation gave way. In the Declaration of Independence, July 4, 1776, merchants, planters, farmers, and artisans joined to proclaim a final break with the mother country and the establishment of their independence.

Well, this was it. The Old Order was yielding. A New Order was emerging. It was the result of a long process. For several generations powerful forces had been at work. More importantly they had been in conflict.

English businessmen had sought with the aid of Parliament and through policies of mercantilism to subordinate colonial commercial enterprise to their own interests. Later the British government imposed principles of imperial administration and fiscal control as the Empire began to take form.

In opposition were forces on this side of the water which had all the power of nature herself. The rigorous frontier environment had been generating certain qualities in the colonists. The battle for survival had been tough. Each man had learned that he must not only pull his own weight in the boat but also that he must first build the boat. Survival depended upon the ability to wrest a livelihood from land or sea by unrelenting toil.

Such exigencies developed in the colonists a high degree of resourcefulness. Resourcefulness, however, is a quality which does not exist alone. Its counterpart is a spirit of independence. Men with the capacity and courage to hew out their own destinies must be free. Then freedom in its turn perpetuates the breed.

Our colonial forbears wanted scope within which to seek a higher standard of living. They wished to be free to trade wherever profit beckoned. It was too much to ask that they forego a glowing future of their own in order to gild that of English businessmen three thousand miles away.

But economics and politics are strongly intertwined. Freedom to trade had been restrained by political leading strings. This duress contributed substantially to concepts of self-government. The arbitrary abuse of political power by an absentee legislature fired these new desires. In consequence the colonists gave of themselves in blood, sweat, and sacrifice to establish an over-all freedom—the American system.

VI.

BUSINESS PROMOTES POLITICAL UNION

THE forty years which followed the surrender of Cornwallis at Yorktown were packed with events of deep significance for American business. The greatest of these was the adoption of the Constitution. Its final acceptance against considerable opposition was largely due to the activity of the merchant and capital interests. This classical charter is preeminently a bill of rights for a democratic, free-enterprise economy.

To understand the events of these early years of the Republic, one must bear in mind the characteristics of the infant nation. At the time of the first census in 1790 the population was somewhat less than four million, of which about seven hundred thousand were slaves. The whole settlement was on a coastal belt about one thousand three hundred miles long and from one hundred to five hundred miles wide. About 90 per cent of the people depended upon agriculture and stockraising for a livelihood. There were no large cities. "In 1790 the census showed six places that had a population of 8,000 or more, the total of whose inhabitants made up 3.3 per cent of the total for the country."¹ The largest city was the port of New York which was growing rapidly and boasted a population of about 33,000. Philadelphia, Boston, and Baltimore followed in that order.

This was still a period of water transportation. Coastal shipping facilities had been well developed during the colonial era. After the Revolution our people turned their attention toward improving river navigation. Great schemes were evolved for extending communication further inland on rivers such as the Connecticut, Mohawk, Susquehanna, and Potomac. The Hudson was already an active highway.

Broadly speaking, the country had hardly any roads and all travel was time consuming. There was one good highway which went from Boston to Worcester. From Philadelphia a few roads led to the rich agricultural hinterland. While there were wagon trails between Boston and New York, even the hardy travellers of that day scarcely called them roads. It took

from eight to ten days to make this journey by stage and cost \$25. The coastal sailing route through Long Island Sound was more commonly used. Its eastern terminus was Providence from where the journey was continued overland. The trip from New York to Albany by boat might consume the better part of a week. It required sixteen days for a Carolina Congressman, Thomas Tudor Tucker, to repair to Philadelphia by boat.²

The conditions which faced American businessmen after the Revolution were not auspicious. When fighting ceased there followed a period of great expectations. Hopes ran high now that the long-sought independence had been achieved. The coming of prosperity was assumed to be just around the corner. As a matter of cold fact, however, the poor war-weary citizens were destined for grim disillusionment. Things grew worse instead of better.

The whole situation, both in government and business, could not have been more discouraging. Congress and the state governments were existing precariously on the artificial respiration which had been provided by repeated issues of paper currency. Agricultural prices were falling. The flow of specie had again turned outward and manufacturing was declining. It was difficult to earn money and almost impossible for farmers and artisans to pay debts.

The reasons for the collapse in the demand for American commodities and articles of manufacture were twofold. During the war there had been the pressing needs of the armies for grains, meats, and articles of household manufacture such as clothing. Small shops had been working "round the clock" on military supplies. With the coming of peace this outlet for goods ceased entirely. Secondly, after the war there developed an extraordinary inflow of English merchandise. During the years of conflict the colonists had been deprived of many articles of comfort and the finer qualities of goods. At the same time the manufacturers of London, Birmingham, and Manchester had accumulated large inventories. This polarity struck an economic spark of no mean proportions. English goods came to the new states in a tidal wave. "In the year following the Peace, \$18,397,335 worth of goods was brought into the country, and but \$3,746,725 was exported in exchange. By 1790 we had accumulated an unfavorable balance of trade to the amount of \$53,992,655." ³

Our foreign trade was a source of great disappointment. It had been confidently expected by the merchants of New England and the middle states that independence would bring us marvelous trade opportunities with Europe. The pot of gold at the foot of this rainbow was missing. When approached by our envoys the nations of Europe became coy about entering into commercial treaties. Although we were convinced of our

own national identity, we still looked like thirteen little colonies to most of the world.

Not only did we fail to realize new triumphs in this field but we also lost some of our former trade advantages. In concluding the treaty of peace, John Bull left some mines of the delayed-fuse type. The old Navigation Acts were continued and operated against the trade of the new independent nation. As a result, our long-suffering merchant-traders woke up to discover that business with their particularly fat customer, the British West Indies, was restricted to vessels built and owned in England and that the importation of the New Englander's salt cod was forbidden. These were hard blows. They hit not only our merchants but our important shipbuilding industry as well. Prior to the Revolution we had been building many cargo ships for the British. Before 1775 costs were about \$24 to \$38 per ton in America as compared to \$50 per ton in England. This differential accounted for the fact that just prior to the war perhaps as high as one-third of English commercial ships were American built.⁴

The period 1781-89 were years of tough going. While we had won a great military victory it began to look as though we had been economically vanquished. The political chaos which prevailed on the domestic scene added bitterness to this potion. Having won our independence we were failing miserably in the task of self-government. The Articles of Confederation (1781) provided no effective basis for either federation or union. Instead of achieving national unity the former colonies were in effect continuing to operate as thirteen separate states. Small wonder that Europe continued to regard them as such.

There is nothing so destructive to the cause of good government as the semblance of authority without its substance. The Articles of Confederation denied Congress two vital things—the power to levy taxes and the right to control foreign and interstate commerce. Little respect and only irritable attention were therefore paid to the federal government. At the same time the states were enjoying a legislative debauch in exultation at having won their independence. They had retained the right to issue currency. For some time they exercised commendable restraint but, under the impact of sharply declining business conditions in 1785, many of them proceeded to fill the air with paper money. Then these separate legislatures began to enact a miscellany of import duties on foreign goods, both for revenue and to protect local interests. Massachusetts even went so far as to prohibit altogether the importation of certain articles.

One state would enact low import duties so that its merchants might bring in merchandise from abroad and tranship it into a neighboring state

which maintained higher tariffs. In retaliation an interstate duty would be imposed on this trade. Meanwhile there arose complicated problems as to the jurisdiction of different states over commerce on inland waterways. Virginia and Maryland engaged in an acrimonious dispute about traffic on the Potomac. Adding to this confusion was the fact that our businessmen were calling in vain upon Congress to secure trade treaties with other nations. To sum it all up, one may say that the state assemblies were playing hob with business in general and Congress was beating the air in gestures of utter futility.

In the meantime a forceful hard money movement had got under way. The specie which had come into the colonies from the spending of the British and French armies, plus our own borrowings, gave the country a moderate supply of hard money. As more paper was issued and as its value sank to ridiculous levels, the tendency grew to do business in specie. This was a natural but painful corrective. It was accomplished by the usual sufferings of a deflation. Prices and money wages fell. In the swing from paper to specie, people complained of the scarcity of money. Manufacturing declined, pay rolls diminished, and business stagnated.

Viciously entwined with the depression of business was the accelerated purchase of foreign goods. This caused not only a decline in our own manufactures but a noticeable outflow of specie as well. Part of this movement was a normal operation of our merchants and traders. However exaggerated reports circulated as to the amounts of specie sent abroad. To the debtor classes, made up largely of laborers and farmers, this seemed like high crime. Their complaint was that while they could not come by any hard money, the wealthy were sending it abroad. The seething discontent of debtors and the advocates of more paper money climaxed in Shay's Rebellion in Massachusetts in 1786. This was a social disturbance of serious proportions and it took some four thousand troops to quell the uprising. It served to indicate just how bad conditions had become.

The forces tending toward complete disorganization engendered a positive and more powerful force in the opposite direction—a movement for a more effectively organized union. While there were some who were concerned primarily with political problems, the real impetus toward the adoption of the Constitution came from the merchant and large landowning classes. It had now become clear to them that a continuance of the loose federation of states spelled ruin for business and extinction for capital. As British colonies they could afford separate self-sufficiency. It was an entirely different situation when the protection of the mother country was removed. In world trade a divided people were at the mercy of

strong European powers. At home domestic business was being stifled by state rivalries and legislative irresponsibility.

Leaders of business, both merchants and planters, came to realize that they were faced with a compelling necessity. Something had to be done to avoid utter chaos. There was only one road and that led to "a more perfect union." The first links in the great chain of events which was now to unfold grew out of one of our pressing economic problems. The dispute over regulating commerce on the Potomac had become acute. In 1785 commissions from Maryland and Virginia met to discuss the thorny question. At this session it was proposed that a meeting be called of delegates from all the states to confer on matters of common interest. Accordingly the Annapolis Convention was held in 1786. Attendance was poor. Its great accomplishment lay in issuing the call which was to result in the Constitutional Convention of 1787 in Philadelphia.

When the great charter for union was finally drawn there followed the nip-and-tuck battle for its ratification. Lines of cleavage which were to have far-reaching consequences developed between classes of different economic interest. Businessmen and large land-holders favored adoption. Opposition came most from those less fortunate in the economic struggle—the small farmers and artisans.

As to the reasons which prompted the proposal for the Constitution and its ultimate ratification, Fisher Ames, who had been a member of the Massachusetts Ratifying Convention, had this to say when addressing Congress some years later:

"I conceive, sir, that the present Constitution was dictated by commercial necessity more than any other cause. The want of an efficient government to secure the manufacturing interests and to advance our commerce, was long seen by men of judgment and pointed out by patriots solicitous to promote our general welfare." *

Charles A. Beard has summed it up as follows:

"To speak more precisely, the contest over the Constitution was not primarily a war over abstract political ideals, such as states' rights and centralization, but over concrete economic issues, and the political division which accompanied it was substantially along the lines of the interests affected—the financiers, public creditors, traders, commercial men, manufacturers, and allied groups, centering mainly in the larger seaboard towns, being chief among the advocates of the Constitution, and the farmers, particularly in the inland regions, and the debtors being chief among its opponents . . . but with all due allowances, it may be truly said that the Constitution was a product of a struggle between capitalistic and agrarian

interests." * Speaking broadly this was the same division which was later to mark the Federalist and Jeffersonian parties.

Ratification was secured by only a breath-taking margin. This was obviously no mass movement. On the other hand, once ratified popular support was given to putting the Constitution into effect. "Differences of opinion there were . . . but that the new government was to restore public credit, establish adequate revenues, create a nation-wide judicial system, pay the debt, strengthen the defenses on land and sea, and afford adequate support to trade and commerce the members of the convention who met again as members of the federal government, must have been reasonably certain." †

VII.

ALEXANDER HAMILTON—FINANCIAL PILOT

THE first great problems to be faced under our newly adopted charter for union were of a financial nature. Moreover, they were laden not only with economic significance but with sectional politics and emotional feeling as well. An inept handling of them would have been disastrous. Their solution called for nothing less than the qualities of genius. Fortunately for us there was at hand one possessing the required capacities to a unique degree. Alexander Hamilton was appointed Secretary of the Treasury.

In assuming his duties, Hamilton approached the problems from a sound base. He saw clearly that what the people wanted more than anything else was an ordered system under which they could work to advance their standard of living; that to secure this they must have confidence in government and know the rules under which they might operate; that the first essential for such confidence was a condition in government itself—character and integrity. He knew that to achieve this the financial credit of government must be established on a high plane. It was not alone that he knew these things, the important thing was the way he knew them. He believed in them with flaming zeal.

As the first Secretary of the Treasury under the new Constitution, Hamilton needed both conviction and daring. When he took office the Treasury was empty and its credit in disrepute. The people hated taxation. Business conditions were chaotic. The Constitution was not then the great legislative Gibraltar which it has since become. At that time many people regarded it as simply a dignified manifesto, couched in general terms, of a plan for perfecting a union, adopted by a group of states which had just shown their incapacity to live under a federation.

Hamilton realized that his only chance lay in pursuing a courageous course. He decided to avoid the pitfalls of compromise. If union under the Constitution was to work, it would have to do so at once. He proposed to submit it to major stresses. Accordingly he brought forward such meas-

ures as in his own best judgment he thought would bring order out of chaos. These were contained in four famous documents; the *Report on Public Credit*, January, 1790; the *Report on a National Bank*, December, 1790; the *Report on the Establishment of a Mint*, May, 1791; and the *Report on Manufactures*, December, 1791.

The *Report on Public Credit* first addressed itself to the critical and thorny problems of funding the federal debt, both foreign and domestic. The underlying purpose of his proposals was to establish the credit of the new nation upon an irreproachable basis. In Hamilton's opinion the whole Law and the Prophets depended on honesty and faithfulness in carrying out our obligations:

In so strong a light, nevertheless, do they appear to the Secretary, that on their due observance at the present critical juncture, materially depends, in his judgment, the individual and aggregate prosperity of the citizens of the United States: their relief from the embarrassments they now experience; their character as a people; the cause of good government.

If the maintenance of the public credit, then, be truly so important, the next inquiry which suggests itself is, by what means it is to be effected—the ready answer to which question is, by good faith, by a punctual performance of contracts. States, like individuals, who observe their engagements, are respected and trusted: while the reverse is the fate of those, who pursue an opposite conduct.¹

In substance Hamilton urged payment in full, together with arrears in interest, of all federal debts except the ill-fated bills of credit, the paper currency of the Continental Congress. No objections were raised to paying the foreign debt which, with interest, amounted to \$11,710,000. However when it came to the internal federal debt the problem was somewhat akin to juggling a hornet's nest. Together with arrears in interest it amounted to approximately forty-two million dollars. This was represented by many forms of certificates issued under varying circumstances. All had severely depreciated. Some had been used as currency and had passed through many hands. By the time Hamilton submitted his plan of funding a rapacious crowd of speculators had bought up large amounts of these loan certificates at low prices. Payment in full meant inordinate profits to them and bitter resentment on the part of those patriotic original subscribers who had been forced by war circumstances to sell at a loss. Many persons felt that an attempt should be made to compensate original as well as final owners. Beyond the question of equity, however, Hamilton recognized the more fundamental one of the sanctity of contract. The last owner held in his hand the promise of Congress to pay. Furthermore, any attempt to judge equities involved so many difficulties of administration that it was a practical impossibility. There was also the urgent

necessity for prompt and positive action. Hamilton insisted that the restoration of our credit be achieved by scrupulously living up to the original promise—payment in full to current holders. Congress finally approved.

In the same *Report on Public Credit*, Hamilton also proposed that the federal government assume the debts of the states, incurred largely in the furtherance of the war effort. Added to the issues raised by the funding scheme, this plan aggravated both political and sectional differences. The southern states, believing that their debts were smaller than those of the northern states, claimed that assumption favored the north. The issue was settled by one of the most notorious horse trades in our political history. Adherence of the southern states was secured by conceding to them the location of the new national capital at Washington. The federal government assumed eighteen million dollars of debt from the thirteen states.

What became of the Continental bills of credit, the inflated paper currency of the war? Their end was ignominious. Under the funding plan they were made receivable in payment for the new bonds at the ratio of \$100 in Continental bills for \$1 principal amount of the new bonds—a depreciation of 99 per cent. This was the final settlement of that concealed form of taxation, high inflation of the currency.

The new bonds now issued by the federal government were secured by a pledge of national revenues and the proceeds from the sales of western lands. The twelve million dollars issued to pay off our foreign loans was given a priority. Interest on the bonds for the domestic settlement was subject to some rather complicated adjustments but was paid quarterly at thirteen paying centers.³

Hamilton's resumption program was successful. The practical results justified his position. Our new bonds were well regarded by investors and the market was strong and active. Abroad the credit of the new republic was so well restored that a few years later the government was borrowing from bankers in Holland at about 4½ per cent interest. Restoration of government credit gave tone and tonic to the whole business system. A feeling of confidence replaced an atmosphere of suspicion and confusion.

Hamilton's next major proposal, a plan for a national bank, was set forth in his report submitted to Congress in December, 1790. He was one of the few men in the United States who had had any experience in the new field of banking. When Hamilton was a member of the Continental Congress he had consulted with Robert Morris on the operation of the Bank of North America. As an attorney in New York, he had helped launch

the Bank of New York. Financial problems had a particular attraction for him.

In proposing the first United States Bank, Hamilton had in mind an institution to serve both public and private needs. Business was suffering from a scarcity of money tokens as well as a lack of credit facilities. Under the new Constitution, Congress did not have the power to issue bills of credit. However, Hamilton and others believed that it did have power to charter a bank and permit it to circulate its own bills or notes—a somewhat fine but nevertheless a practical distinction.

Following Hamilton's proposal, the United States Bank was chartered by Congress and started business in 1791 with a capital of ten million dollars. Of this amount, eight million was offered for public subscription; the terms to be 25 per cent in specie and 75 per cent in government bonds. The government subscribed for two million of the capital, to be paid for by a loan from the bank. The public offering was a great success. The provision for part payment of the stock of the bank in bonds served a constructive collateral purpose. The taking of six million dollars worth of government bonds out of the floating supply strengthened the market. The notes which the bank issued, convertible into these bonds, began to look pretty good and circulated without discount.

The charter of the United States Bank gave it a life of twenty years. The main office was in Philadelphia and in spite of opposition by Hamilton and others branches were opened in Baltimore, Boston, New York, Washington, Norfolk, Charleston, Savannah, and New Orleans. Management was vested in a board of businessmen of high repute. Hamilton had insisted that its direction be kept out of the hands of government. He had written, "To attach full confidence to an institution of this nature, it appears to be an essential ingredient in its structure, that it shall be under a *private*, not a *public* direction . . ."

The functions of the new bank were broad. It made advances to the Treasury. At one time these ran up so high that the board of the Bank insisted that the government sell its bank stock and use the proceeds to reduce its borrowings. The bank also functioned as a depository of government funds and a fiscal agency for the Treasury. It assisted in foreign remittances. In the field of business the bank served a wide range of private citizens in their usual commercial affairs.

The record of this first United States Bank was excellent. Its policies were well founded and in general its practices conservative. From the outset the bank was able to pay dividends at the rate of about 8 per cent per annum. In carrying out its functions a high tone of business ethics was given to the country. This was so high that for a while the bank was

under criticism. One thing it insisted upon was punctuality by borrowers in meeting their obligations. This was perhaps a little ahead of the times. Customers of irregular habits felt themselves much put upon. They complained that this policy was causing a shortage of specie.

In addition to sponsoring the first United States Bank, Hamilton officiated at the birth of what has become today one of the world's most respected media of exchange—the American dollar. In his *Report on the Establishment of a Mint* he proposed that the value of our new unit of currency, the dollar, be expressed in gold and silver at the bullion ratio then prevailing: 1 to 15. This was carried out under the Mint Act passed in 1792. Gold was used for coining "eagles," "half-eagles," and "quarter-eagles" (\$10, \$5, \$2.50). Silver was employed for coining the new dollar, which was "to be the value of a Spanish milled dollar as the same is now current . . ." There was no serious controversy over the substance of this Act. There was, however, one minor question which caused feelings to run high. Should or should not the new coins be impressed with the head of the President? Opponents of the idea claimed that such a course would signify a leaning toward personal government and a stultifying submission to the practices of royalty. They advocated instead the use of the figure of the Goddess of Liberty. The devotees of the Goddess won.

The fourth major Report submitted by Hamilton, the *Report on Manufactures*, was received by Congress in December 1791. A striking feature, and one almost incredible to us today, is that the Secretary of the Treasury found it necessary to argue that manufacturing would be beneficial to the country. This was in answer to the "mossbacks" and "Old Bourbons" of the time who maintained that our national destiny lay along the line of agricultural expansion.

Hamilton came out strongly for manufacturing. He recommended protective tariffs and urged that from the revenue so received subsidies be paid to those industries we wished to stimulate. Further, he proposed a national fund, administered by commissioners, to finance the importation of new machines and skilled mechanics. A premium was to be paid to inventors for the discovery of new processes of manufacture.

In applying his principles to particular industries he recommended a protective tariff on iron products but advocated admitting copper free. He urged lifting the duty of three cents a pound on cotton for a reason which seems startling today; that our domestic supply might prove inadequate to the growing needs of our textile factories. He laid great emphasis on the benefits which would result from the application of waterpower to manufacturing processes.

This report of Hamilton's was a brilliant and forward-looking docu-

ment. He sensed with astounding prevision that manufacturing would come to play a major part in the American economy. Although Congress responded cautiously to the recommendations, its first revenue measures did reflect in the duties laid down on imported products the general policy of protectionism.

Meanwhile in the field of finance other important developments were taking place. The successful launching of the United States Bank gave impetus to a movement already under way which was shortly to attain significant proportions. This was the organization of commercial banks under state charters. The time was now ripe. Commerce was expanding

B A N K.

IT appearing to be the disposition of the Gentlemen in this City, to establish a BANK on liberal principles, the stock to consist of specie only: they are therefore hereby invited to meet To-Morrow Evening at Six o'Clock, at the Merchant's Coffee-House; where a plan will be submitted to their consideration.

Notice of meeting which led to formation of the Bank of New York in organizing which Alexander Hamilton took a leading part.

Courtesy of Bank of New York and Fifth Avenue Bank

and the country needed a more liberal supply of money and credit. The first state bank was the Massachusetts Bank, chartered in February, 1784. It was located in Boston.

A few weeks later a group of leading merchants in New York City organized the Bank of New York. Hamilton was one of its moving spirits and drew its constitution. The \$500,000 capital was raised by the sale of 1000 shares of stock, paid for in gold and silver. On its board or among its first shareholders were General McDougall, Samuel Franklin, Joshua Waddington, Nicholas Low, Rufus King, John McVicker, Aaron Burr, and Isaac Roosevelt. The Bank of New York had an auspicious start and is still doing business in New York City, only a few short blocks away from its original location on Pearl Street.

While our knowledge of banking was then rudimentary, it is interesting to note some of the rules of this first New York bank. Notes and bills of

exchange were discounted "at six per cent. per annum; but no discount will be made for longer than thirty days, nor will any note or bill be discounted to pay a former one. Payment must be made in bank notes or specie." Furthermore "no drafts will be paid beyond the balance of the account."⁵ This last rule was a departure from the English practice of permitting overdrafts as a means of making loans. The accounts were kept in dollars although the coins handled were foreign until after the passage of the Mint Act in 1792. Exchange calculations were formidable because of the multiplicity of foreign coins in circulation in our port cities. The Bank of New York enjoyed the distinction of making the first loan to the Treasury after the formation of the new government under the Constitution. By the terms of this loan arrangement the Treasury drew drafts upon the bank in order to obtain funds.

The starting of banks in our larger cities was soon followed by similar action in the smaller and more remote communities. The idea swept the country like wildfire. It quickly attained speculative proportions and was referred to at the time as "Bancomania." Henry Lee described a trip from Philadelphia to Alexandria in August, 1791 as "one continued scene of stock gambling; agriculture commerce & even the fair sex relinquished, to make way for unremitted exertion in this favorite pursuit."⁶

Such a fever is easy to understand. Fresh in the minds of these people were the economic ills engendered by England's restrictive trade measures and by a long, exhausting war. The common diagnosis of their immediate troubles was "not enough money." While the new Constitution denied the states the right to issue bills of credit, it was generally assumed that the states retained the power to charter banks which in turn could legally issue banknotes. The citizens of the new nation grasped at this process as a formula for prosperity. If a little of the tonic was good, a lot would work wonders.

The speculative frenzy built up quickly. When Hamilton executed his funding and assumption plan in 1791, bondholders had made sensational profits. In the following year subscribers to the stock of the United States Bank also did well. Its stock offered at \$400 per share was by August, 1792, selling for around \$600. Accordingly people were carried away with the hope that the stock of state banks would repeat these happy results. The following advertisement appeared in connection with the opening of a bank in Providence:

"Any persons who may neglect attending at the Court-House at the hour appointed . . . are particularly desired to remember, when the script of this Bank may be selling from fifty to one hundred per cent. profit . . . that they will have none to blame but themselves . . ."

New York City was the scene of the launching of some of the most ambitious projects. At the peak of the movement there was formed the Million Bank of the State of New York. When its shares were offered at \$500 each to constitute a capital of one million dollars, subscriptions were received for ten million. The next day investors were given an opportunity to subscribe for shares in the Tammany Bank whose capital was to be two million dollars, and then in the Merchants' Bank.

According to the usual pattern, this period produced a dramatic character who epitomized and led the speculative fever. This was William Duer, friend of Robert Morris and financial adventurer. He was born in England, educated at Eton, and had served as an aide-de-camp to Lord Clive in India. Coming to America to purchase lumber, he finally settled in New York City and later served as Assistant Secretary of the Treasury under Hamilton. Duer might perhaps be called America's first big stockmarket operator. In December, 1791 he organized a syndicate, currently known as the "Six Per Cent Club," for "making speculations in the Debt of the United States." Subsequently, as Duer's mood became more expansive, he extended his operations to include trading in bank stocks of various kinds.

By this time the speculative boom was reaching a crisis. "In March, 1792, Duer found it impossible to go on and his 'stoppage' created great distress at New York, as there was scarcely a capitalist who was not concerned with him. . . . Securities were pressed for sale and money could not be obtained at any interest. At one moment it was said that as high as one per cent per day was tendered for funds and in vain, although the best bonds and stocks were tendered as collateral security. Hamilton now interfered by authorizing William Seton to purchase public stocks to the amount of one hundred and fifty thousand dollars." ^a The Six Per Cent Club was liquidated to pay off only about 5 per cent of the moneys invested. Many people were ruined and Duer, according to the laws of that time regarding debtors, went to jail. The panic was, however, of short duration. By late 1792 speculation in bank shares was again under way.

Although speculation had been heavy and often disastrous, much of the trading in securities was sound and a healthy sign of expanding business. We have seen how after Hamilton had completed his funding in 1790 there began to be an active turnover in the nearly eighty millions of outstanding government bonds. As new bank stocks were issued the volume of security business substantially increased. This widespread dealing in bonds and stocks had previously been unknown in America. It gave impetus to the security business and to the formation of one of America's most famous institutions—the New York Stock Exchange.



To the President, Directors & Com-
pany of the Bank of New York.

No. 1.

Pay to Samuel Mercedith Treasurer of
the United States, or Order, the Sum of
Twenty thousand Dollars being the A-
mount of a Loan agreed to be made by the said
Bank to the Secretary at War, in pursuance of
an Appropriation made by an Act of Congress
of the twentieth day of August 1789: for
which this shall be your Warrant.

Dollars 20,000.

Given under my Hand and
the Seal of the Treasury on the
thirtieth day of September 1789

Alexander Hamilton
Secretary of the Treasury.

Countersigned by
N. C. Colvergh Compt.

Facsimile of Treasury Warrant No. 1, drawn by Hamilton on the Bank of
New York

Courtesy of Bank of New York and Fifth Avenue Bank

A small group of brokers in New York City began to meet regularly near a certain buttonwood tree at about the place that is now 68 Wall Street. In 1792 some twenty-four of these brokers signed an agreement relating to fair practice which also provided that "We the Subscribers, Brokers for the Purchase and Sale of Public Stock, do hereby solemnly promise and pledge ourselves to each other, that we will not buy or sell from this day, for any person whatsoever any kind of Public Stock, at a less rate than one quarter per cent. commission on the specie value and that we will give a preference to each other in our negotiations . . ." There were no further important developments until 1817 when a regular meeting room was rented at 40 Wall Street and the association was formalized by adopting a constitution and the name, "The New York Stock and Exchange Board."

While there had been wild speculation in the shares of new banks, it must not be inferred that the movement for increased banking facilities was without justification. On the contrary, the country was in dire need of an expanded currency. Growing business required added credit facilities. These new state banks began at once to perform an important function. They accepted deposits, made loans, and issued banknotes. Checks were widely used by clients in making commercial payments. One difference between present-day banking practice and that of these early state banks is interesting. Upon granting a loan the present procedure is to set up a credit in the borrower's favor on the books of the bank. These early banks issued their own notes instead.

The formation of new banks and the issuing of banknotes proceeded at such a rapid rate that an inflation of the currency resulted. This contributed to the rise of prices. Beginning in 1784 with two state banks, by 1811 we had about eighty and an estimated twenty-two million dollars of banknotes in circulation. This compared with approximately five million of notes of the United States Bank and an estimated specie supply of ten to fifteen million. In other words the notes of the new state banks had become a chief circulating medium. During these years the index of domestic wholesale prices rose about 30 per cent.⁹

In this hectic period of starting a multitude of new banks and operating them with practically no banking experience, the record of the Bank of the United States was outstanding. Under private management it served the government and business well. It was wisely and conservatively managed. Its operations were profitable. Preeminence was attained and a high reputation established. Such success, of course, was bound to breed envy and a liberal crop of those who hoped in some way or other to get their hands into the pie. Among the various grounds for criticism seized

upon was the fact that a large amount of the bank's stock had been purchased by shrewd English and Dutch investors. More deeply rooted, however, was the states' old jealousy of power in the federal government. Fledgling state banks greedily eyed the volume of business which flowed to the national institution. As a result of growing popular sentiment against the bank, the charter was allowed to expire in 1811. The jackals of local special privilege licked their chops in anticipation.

VIII.

EXPANDING FRONTIERS

The China Trade and Westward over the Wilderness Road

WE RECALL that immediately after the Revolution Great Britain had again invoked the Navigation Acts to prevent resumption of our profitable trade with the British West Indies. The colonists, however, found it was an ill trade wind, even if in the form of an English statute, that blew no good. The loss of our former trade routes caused the development of a new and glamorous chapter in American commerce. Yankee merchants with their good ships, tall of spar and sleek of line, reached out to new horizons. The China trade was opened.

At the close of the war word began to get around in our seaport cities that there were high profits to be made in doubling the Cape of Good Hope. Added zest was given by the fact that this was poaching on English preserves in India and China. It did not take our merchant traders long to figure out that it was better to venture their ships in this new field than to allow them to rot at American wharfs for want of their former trade in the West Indies.

One of the first trips over the new route was made by the *Empress of China* which put forth from New York in February, 1784, under the command of Captain Greene. The round trip to Canton by way of the Cape of Good Hope was made in fourteen months and twenty-seven days.¹ The next year, Elias Hasket Derby of Salem sent his *Grand Turk* to China and India. Other merchants now joined in the race. The Cape of Good Hope became a Yankee crossroads.

Each of these voyages to the Far East was a great adventure. Sailing preparations were in progress for months. Trading cargoes must be assembled; iron brought from the Baltic, cotton duck and cordage from Europe, wines from Spain and Madeira, gin from Holland, food stuffs from our

own back country. Then the ship itself must be made ready. Each timber of the hull must be tried and all seams caulked. Spars, rigging, and ground tackle must be tested and a store of extras laid in the hold. One must go prepared, for the gales of the Atlantic and typhoons of the east were not easy on a ship's gear. Not of least concern was armament. Pirates lurked in the West Indies and in the China Sea. The ship must be half man-of-war with cannon mounted amidships and with muskets and cutlasses for the crew.

One of the active ports in the China trade was Providence. In this city no merchants were more alert in both foreign and domestic business than Messrs. Brown, known throughout the trading world of that day as "Nicky, Josey, Jack, and Mosey." The following note from Jack to Mosey gives a good picture of an American merchant's entry into the China trade:

PROVIDENCE, AUGUST 18, 1787

Brother Moses not knowing wheather I may see you before I go to the Assembly, next Monday, I take this method to inform you that I have it in contemplation to Fit the Ship *Genl Washington* to the East Indies in which Case shall not be any more concerned in the Ginney Trade. Thier is a Man by the name of Hayley An Englishman that has lived 7 Years in India and gives Good Encouragement to send the Ship, he will go in her . . . if she goes she ought to carry a Cargo from £10000 to £12000 L.M. value, in Cannon, Shot, Anchors, Barr Iron, Tarr, Ginseng, Madearia Wine, Brandy and Sperits, Jamaica Sperits; Mr. Hayley Ses, but New England Rum made very strong I should think may answer as by the time it gets there will be about as good. For such a Cargo carried to the Hither Indies, and to take a Freight from there to China she may bring a Cargo home worth £40000. The Wine to the amount of 1/3 the Cargo to be taken on board at Madeira on the outward Passag. It may be mostly had on 6 and 12 Months' Credit, with 8 or 10000 Dollars Cash. the Ginseng and other parts of the Cargo . . . may be purchased. *Will you be concerned* . . .

Yrs &c

JOHN BROWN²

This letter presents a typical situation. John Brown was switching the *General Washington* from the African trade to the China trade. The outward cargo was hard iron and hard liquor. In foreign trade your Rhode Islander was pretty much on a rum standard. On the home voyage, tea, silks, cotton cloth, and spices comprised the cargo. Having started in December, 1787, the *General Washington* returned in July, 1789, with 32,758 miles on her log. "The total valuation of the goods invoiced (outward) amounts to £7904 7s., or (reckoning 16% cents to the shilling) \$26,348. . . . From this manifest (of the return voyage) we learn that the *General Washington* brought to her owners a cargo valued at £29,951,

or, reckoning 16% cents to the shilling, \$99,848." * This was a gross profit of about 350 per cent. A good old New England custom!

The great merchant prince of the China trade was Elias Hasket Derby of Salem. He was one of the first to sense its possibilities and perhaps the most successful in its exploitation. It is reported that he owned and operated forty ships, although some of them undoubtedly traded in other areas. One of his most successful China voyages netted him \$100,000, a substantial fortune in those days. So keen was his business acumen and so well disposed was Dame Fortune in his behalf that he is said to have been America's first millionaire. Derby and other merchants of his kind made of the little city of Salem one of the best known ports of the whole trade world. In Batavia, Bombay, Canton and the Isle of France, ships and skippers of Salem were as familiar as those from New York, Boston, and Philadelphia.

It is hard for us today to realize what a "b'guess and b'gosh" system of navigation those old skipper-merchants pursued on their long voyages. One of the great ships of that day, the *Massachusetts*, of 600 tons, sailed for Batavia without a chronometer or an officer capable of working out a lunar observation. The Captain crept down the west coast of Africa by noting the color of the coastal waters. Navigation to the West Indies was equally haphazard. "As an old writer humorously describes it: 'The Yankees knew the way to the West Indies a good while ago; they knew more ways than one. Their coasting vessels knew the way, without quadrant or *Practical Navigator*. Their skippers kept their reckoning with chalk on a shingle, which they stowed away in the binnacle; and by way of observation they held up a hand to the sun. When they got him over four fingers they knew they were straight for Hole-in-the-Wall; three fingers gave them their course to the Double-headed-shot Keys, and two carried them down to Barbadoes'." *

As we pressed forward to compete with England for the profitable China trade, conditions in the Atlantic changed considerably for the better. For this fortunate result we had to thank no less a person than Napoleon Bonaparte. By keeping Europe in a state of war or war nerves from 1797 to 1815 he gave our merchants and manufacturers a chance to capture trade formerly carried on by England and France.

An additional impetus toward expanding commerce was provided by the Tariff Act of 1789. This measure, among other things, gave a 10 per cent discount on all import duties on merchandise brought in on vessels wholly owned in the United States. Our China trade was benefited by an increase in the duty on tea imported in foreign-owned ships. This provision was a blow, administered with great relish, at the long hated East

India Company. These were days of hands across the sea—but the hands were clenched fists.

As a result of all these favorable developments our reborn foreign trade grew by leaps and bounds. America took the lead in neutral world commerce. Between 1790 and 1807 the tonnage of our ships in foreign commerce went from 127,000 to 1,089,000; total foreign trade increased from about \$43 million to approximately \$246 million; and the percentage of such commerce carried in our vessels mounted from 24 per cent in 1789 to 92 per cent.

With foreign commerce and shipping expanding so rapidly it was natural that the domestic economy should likewise improve. Not only was there a boom in ship building but other industries began to forge ahead. Although enacted primarily for revenue purposes, the Tariff Act of 1789 gave protection to some of our infant manufactures. Duties in varying amounts were levied on such articles as boots and shoes, nails, glass and chinaware, soap, malt liquors, iron and steel, wool and cotton cards, cheese, and manufactured tobacco. The young republic enjoyed from 1790 to 1807 a period of pretty well sustained prosperity.

This condition of active and rapidly expanding business was not without political significance. These were the first years of government under the Constitution. The period was critical. Had adverse economic conditions prevailed, the new Ship of State might well have foundered in the heavy weather. As it was, good times fostered public content. Prosperity bred satisfaction with government. In the light of developments, both the business and political systems were deemed highly satisfactory.

While our foreign commerce and shipping were sweeping on to new triumphs, other events of deep significance were in the making. After the revolution the dominant interest of our people was the opening of western lands. They looked with high expectations to those vast unsettled areas: Distant pastures never seemed greener. To attain them, however, was not easy. Nature had imposed an obstacle of substantial proportions. This was the Appalachian Mountain system which runs parallel with the Atlantic coast from New England to Alabama. Through this barrier there exists no long river highway of deep penetration leading to the great areas of the west. It was necessary to proceed overland by arduous backbreaking travel through such passes as were available.

One of these was the Mohawk Valley of central New York. Through this were to go the pioneers of eastern New York and New England. A little further to the south, an east-west road was opened from Philadelphia through Lancaster to Pittsburgh—later known as the Forbes Road. From Baltimore and Alexandria two branches of another main passage led

to the upper Potomac where they united to cross the divide over a route originally laid out by Washington. Parts of this road later came to be called the National Turnpike. Over this was to pass a main stream of westward migration.

Further to the south there was developed the most colorful of all the trans-Allegheny passages—the Shenandoah-Wilderness Road. In working out this route, our energetic land-hungry settlers availed themselves of a great natural hallway, to which they added a trail hacked step by step through wild and rugged territory.

A feature of the Appalachian system is a great central valley which runs in a southwesterly direction from Pennsylvania to North Carolina. Through the more northerly portion of this, the Shenandoah Valley, lay the first section of this new route to the west. The second section was the primitive trail, well named the Wilderness Road, which took off in a westerly direction through the Cumberland Gap. The blazing of this passageway was inspired by the initiative of Richard Henderson of North Carolina who like so many of his fellow countrymen was carried away with thoughts of land development in the west. Its construction was made possible by none other than Daniel Boone, who had explored the old Indian trails leading into Kentucky.

In 1774 Henderson and some associates formed the Transylvania Company. The plan was to buy an immense area of land from the Cherokee Indians and resell it in small farms to restless eastern farmers. Henderson had Boone call a meeting of the Cherokees at Sycamore Shoals on the Watauga River. There the Great Treaty was negotiated by which the Transylvania Company purchased (or at least Henderson thought it had) about twenty million acres for £10,000. This comprised parts of North Carolina and Virginia, and most of Kentucky and Tennessee.

Henderson and the Transylvania Company then engaged Boone to open a road into the new domain. The latter, in 1775, recruited thirty lusty frontiersmen possessed of strong backs and sharp axes. They blazed and cut a "trace" through these untravelled fastnesses. It was indeed a brilliant feat in road making. Starting at Watauga settlement on the Holston River in Tennessee, they struck west through the Cumberland Gap, across what was called the "laurel wilderness," into the green rolling meadows of Kentucky. Following Boone came Henderson with some settlers who founded Boonesborough in 1775. Areas of rich land were offered for sale in the hope that a growing flood of farm buyers would be attracted.

Unfortunately for Henderson and the Transylvania Company, their plans were shattered. Both Virginia and Carolina refused to recognize the Cherokee grant. While the great land speculation was never realized, the enterprise had rendered an inestimable service to the young nation.

For years to come an increasing flood of settlers was to pour down the Shenandoah Valley and over the Wilderness Road, following in the footsteps of Boone and Henderson. From salt water to the blue grass of Kentucky and to the fertile acres of Ohio, this was a migratory channel of great importance.

There were, of course, other land companies. One of the earliest of these was the Ohio Company which in 1749 had secured a grant from the crown of some 500,000 acres west of the Alleghanies. After the passage of the Ordinance of 1787 by which the public land system was established, there was increased activity in the opening up of new territory. The Ohio Company of Associates was formed and acquired 1,500,000 acres on the Muskingum River in Ohio which it proceeded to settle with people drawn from New England. The Miami Company took up another million acres in Ohio and with pioneers from the middle states founded Cincinnati.

The opening of the Mississippi watershed to settlement marked a change of real significance. Because of the Appalachian barricade, the great overland distances, and the fact that their river-highways led to the Gulf of Mexico, the pioneer settlers in Kentucky and Ohio looked west and south instead of east. Their products went to market down the Ohio and Mississippi Rivers, and their concern with this system of transportation was an impelling motive for the Louisiana Purchase. The physical characteristics of the continent induced in them a sense of isolation from their compatriots on the eastern seaboard. A western point of view was brought into being. The frontier had crossed the Alleghanies and was thenceforward to remain in the west. This was to have a profound influence upon our affairs, social, economic, and political.

Once this surge of migration started, it grew like a rolling snowball. "In 1790 the Mississippi Valley had a population of about a hundred thousand or one-fortieth of that of the United States as a whole; by 1810 it had over a million or one-seventh; by 1830 it had three and two-thirds millions, or over one-fourth; by 1840 over six millions, more than one-third." Travel from New York to the Ohio River took longer than from London to New York. The western country was to build along lines of its own self-sufficiency. The beginnings were modest. But those tough-fibered, hard-drinking pioneers, toiling over the Wilderness Road of the Transylvania Company and through other rough passes, started a great chain of events: the opening of a vast inland empire, the Mississippi Valley; the conquest of the far west; and finally the creation of a great continental nation, a two-ocean world power in the Western Hemisphere.

IX.

EARLY ADVENTURES IN BUSINESS AND BANKING

DOMESTIC business between 1789 and 1820 went through cycles of prosperity and depression directly controlled by the condition of foreign commerce, which in turn was governed by our relations with England and by political events in Europe. Broadly speaking our business affairs then, and from then right on down to the present, have been tied in one way or another to the politics of Europe.

As we have seen when the rumblings of war echoed across the Channel between England and France, American merchants gained greatly in neutral trade. When peace reigned and we were faced with unrestricted English competition, our foreign commerce fell away and carried domestic business with it. But on the whole our economy expanded. Most of the time farmers secured good prices for their produce. Local trade was active and capital accumulated.

However, when fluctuations did occur they were pronounced. Business was knocked into a cocked hat when Jefferson declared an embargo on exports in 1807. Repercussions from this caused its repeal in 1809 when an act providing for nonintercourse with Great Britain was substituted.

During the first months of the War of 1812 commerce of the middle and southern states suffered disruption because of the English blockade. New Englanders on the other hand, whose ports were unmolested, did a rousing trade, drained specie from the other states, and incurred no little jealousy on the part of their fellow countrymen. Later when the blockade was extended, the whole nation suffered. This gave rise to the same foreign trade conditions as prevailed during the Revolution. Blockade running became an accepted routine. Our privateers once again ranged the seas to harass Britannia and bring home prize cargoes which helped to sustain the flow of commerce.

Although our banking and monetary system was rudely shaken by the war, it did not collapse completely. Specie payments were suspended in 1814 except for the banks of New England. Government deposits in many

state banks were immobilized and the Treasury's notes suffered substantial depreciation. Government bonds to finance the war could only be sold at heavy discount and then in terms of an already depreciated paper currency. It has been estimated that for some eighty million dollars of such bonds the government received a specie value of barely thirty-four million.



Interior view of early hat factory
The Growth of Industrial Art, Benj. Butterworth, United States Patent Office

When the war ended early in 1815, the business situation changed suddenly. Foreign commerce and shipping revived. At the same time English merchants sent over goods in the same surge of speculative adventure as after the Revolution. Prices of manufactured goods fell and the demand for many American products slumped. As a result our diminutive manufacturing plants were badly hit and went through some trying months.

Then came recovery activated by expanding foreign trade and inflation of the currency. Our people were again seized with the mania for starting

new banks. This movement had been interrupted by war conditions. It was now renewed with vigor as hopes, dreams, rainbows, and illusions provided the basis for organizing new institutions. Banks were started without any regard for the legitimate needs of business. "Wherever there is a 'church, a blacksmith's shop and a tavern' seems a proper site for one of them!"¹ By 1816 the new nation boasted upwards of 240 banks all born within one generation. Spurred on by a speculative frenzy and the suspension of specie payments, these unregenerate institutions erupted bank notes in a volcanic manner. Circulation jumped from about \$22 million in 1811 to almost \$100 million in 1817.²

This condition added to the dissatisfaction with the banking system which had arisen during the war. It was increasingly apparent that the state banks constituted a weak reed upon which to rely. The situation called loudly for better organization. Congress had come to regret that it had discontinued the strong Bank of the United States which had served so well from 1791 to 1811.

Accordingly in 1816 the second Bank of the United States was organized. Its plan was much like that of the first Bank except that the capital was \$35 million instead of \$10 million. Of this capital the government was to subscribe \$7 million in specie or in 5 per cent government bonds and the balance, or \$28 million, was offered for public subscription, payable one-quarter in specie and three-quarters in government bonds.

This new Bank was given a charter for twenty years, exclusive except for the District of Columbia. It was to be the official custodian of government funds, unless the Secretary of the Treasury should appear before Congress with reasons to the contrary. Its notes were to be payable in specie upon demand and were to be limited to the amount of the Bank's capital. Out of twenty-five directors, five were to be appointed by the President. For these privileges the Bank was to pay the government \$1,500,000, transfer its funds without charge, and undertake to get the system of state banks back on a specie basis. This last was quite a contract!

Unfortunately for the country, this second Bank of the United States did not at the outset repeat the excellent record of the first under the aegis of Alexander Hamilton. The launching was far from auspicious. When the shares were offered in July, 1816, public interest was apathetic. Subscriptions dragged along. The Treasury was only rescued from its embarrassment when Stephen Girard of Philadelphia assumed the unsubscribed portion of some three million dollars of the Bank's stock. As public subscriptions fell due, conditions as to payment in specie and government bonds were unwisely relaxed.

Early in 1817 this second Bank of the United States was ready to

undertake its responsibilities, the principal one being to induce the state banks to resume specie convertibility of their extensive note issues. The new Bank was successful in working out an agreement to this effect. The state banks promised to resume specie payments but only under conditions which put the national Bank in a vulnerable spot. Theoretically specie payments were resumed at the end of February, 1817.

However, the program did not work out. The basic difficulty was that our people were embarked on a speculative binge which was especially hectic in the south and west. The management of the second Bank was carried away by the prevailing frenzy. It also fostered speculation. In addition, several of its branches got completely out of control and went on their own way rejoicing. Meanwhile the state banks of the west and south plunged ahead in their hectic adventures. Their pledge to resume specie payments was honored largely in the breach. Almost every device was resorted to in order to avoid responsibility for final payment. Bills of exchange were met by hastily issuing more bills on other banks. These became known as "racehorse" bills because it was said that it took a race horse to catch up with one.

Instead of furnishing the business community an example of probity and constructive leadership, the second Bank got into quite a mess of its own and floundered bewilderingly in its policies. Stock manipulators in Philadelphia and Baltimore had acquired a dominating influence in the determination of its policies. Interest became centered in "bulling" the price of its shares. Large loans for purchasing the stock were made to officers of the Bank as well as to friendly speculators. In Baltimore these operations were particularly flagrant, involving personal overdrafts to officers, false entries, and other derelictions.

This was but one manifestation of the speculative orgy which had seized our people. In the East it was bank shares and merchandise inventories. In the South it was land and cotton. In the West it was land and more land. Finally in 1819 the bubble burst. Prices collapsed. A huge army of debtors suddenly faced the grim reality that they could not pay. The little group of speculators at the Baltimore branch of the Bank of the United States caused it a loss of about \$1,400,000.

Under the impact of business distress, officials of the Bank swung round like a weather vane to the prevailing wind. They were thoroughly frightened and suddenly "got religion" about speculation. But in this reversal, they once more succeeded in doing the wrong thing. As business troubles became acute and banking conditions precarious, instead of relaxing pressure for payment of state bank balances, the Bank increased its importunities. Policies of vigorous retrenchment were applied. This accentuated

the existing ill-feeling between the state banks and the national institution. The former, together with innumerable local debtors, claimed that they were being ruined by the machinations of an insensate money monopoly. The situation was aggravated in the south and west where in fact the debtors had no liquid resources with which to pay. At this stage of deflation what was needed was extension, not retraction, of credit.

The Bank, however, continued to put on the screws. When debtors could not make good, the security which they had pledged was seized. The situation in the city of Cincinnati was somewhat typical:

As a consequence of the transfer of real estate the bank owned a large part of Cincinnati: hotels, coffee-houses, warehouses, stores, stables, iron foundries, residences, vacant lots; besides over 50,000 acres of good farm land in Ohio and Kentucky. Its possession of this vast property maddened the former owners, now impoverished by a recklessness which they would not acknowledge. . . . Moreover, the situation gave to the politicians an opportunity too tempting to be neglected, and by a slight effort of the imagination one can almost hear the reverberations of "Old Bullion" Benton's voice startling the drowsy Senate as he thunders: "I know towns, yea, cities where this bank already appears as an engrossing proprietor. All the flourishing cities of the west are mortgaged to this money power. They may be devoured by it at any moment. They are in the jaws of the monster! A lump of butter in the mouth of a dog! one gulp, one swallow, and all is gone!"^s

Thus through the mouthpiece of "Old Bullion" did the harassed debtors of the west and south give voice to their distress. Especially bitter was the feeling of local state-bank groups against the Bank of the United States. In it they saw a strong outside competitor. More galling, however, they found in it a monitor now determined to impose principles of specie payment upon banks who would live by paper alone.

This antipathy had been growing for some years and found expression in a series of laws by various states intended to restrict the power of the Bank's branches or to embarrass them through taxation. The State of Maryland was one of those seeking to impose such a tax. In so doing it unwittingly set the stage for a notable event in the evolution of the American system of government. Chief Justice Marshall was given the opportunity to bring to life before his countrymen the Constitution as the great charter for a united people.

The case in the United States Supreme Court was that of *McCulloch v. Maryland*. Did a state have the right to tax an instrumentality or activity of the federal government? That was the *prima facie* issue. The real issue, everyone realized, went to the very fundamentals of government. The new nation had reached a crossroads. At last the question which had

been seething in the minds of many was brought out into the open before the supreme tribunal of the land. Were we to have a strong, vigorous union or was that concept to fall, a sacrifice at the altar of local sovereignty?

The case was argued in the humble setting of a basement room of the national capitol. It seems that in planning that building the Supreme Court had been overlooked. But the very simplicity of the scene lent emphasis to the importance of the drama which was being enacted. A distinguished array of legal talent appeared before Marshall and his Associate Justices. For the Bank, there were Daniel Webster, William Pinkney, and William Wirt. In opposition, to support the Maryland case, were Luther Martin, Joseph Hopkinson, and Walter Jones.

With promptness, on March 6, 1819, the Chief Justice delivered the Court's opinion as written by himself. In no sense was he a pussy-footer. He went to the root of the issues and was utterly forthright in his conclusions. If a state could tax one agency of the federal government it could, with equal reason, levy on others. The "power to tax involves the power to destroy." Such authority in the states would be equivalent to the right of veto over federal action. This whole line of thought led directly to the negation of an effective union.

As to the particular issue raised by this case, Marshall came out flatly for the supremacy of federal authority. To support it, he invoked the doctrine of implied powers within the Constitution. "Let the end be legitimate, let it be within the scope of the constitution, and all means which are appropriate, which are plainly adapted to that end, which are not prohibited, but consist with the letter and spirit of the constitution, are constitutional." 4

Basically, the Chief Justice conceived of the Constitution as drawing its authority from the people themselves and not the states: "The government proceeds directly from the people . . . their act was final. It required not the affirmance, and could not be negated, by State governments. The constitution when thus adopted was of complete obligation and bound the State sovereignties." 5 Thus did Marshall define the framework of an effective union. The people themselves had drawn this charter. It was their will. It must have life. It must have growth. It must give being to the nation.

This decision was one of a series handed down by the illustrious Chief Justice during a memorable period when the fate of the new republic hung in precarious balance. We recall how during the Confederation the separate states quarrelled over trade, enacted retaliatory tariffs as between themselves, and generally made it difficult to carry on commerce,

Marshall's interpretation of the Constitution gave us a governmental system under which American business was to secure a large measure of freedom from parochial jealousies and the opportunity to grow on a national scale. Its subsequent accomplishments, the quantity production of goods, our high standard of living, and our incomparable position as an industrial power may in great degree be credited to the existence of political union to which this Virginia gentleman contributed so mightily.

X.

REVERE ROLLS COPPER AND SLATER SPINS YARN

WE HAVE seen that when the new nation began to sense its power under the Constitution manufacturing was still in a primitive condition. The typical production unit was the farm-household which in addition to its own requirements fabricated a small surplus for the local trade. In total value, cloth was the most important product. Clothing and articles of leather came next. "In Gallatin's *Report on Manufactures* in 1810 he declared that by far the greater portion of goods made of cotton, flax, and wool was manufactured in private families, mostly for their own use but partly for sale; and, . . . he concluded, it is probable that about two-thirds of the clothing, including hosiery and of the house table linen, worn and used by inhabitants of the United States, who do not reside in cities, is the product of family manufactures. In the iron and steel industry he estimated the value of domestic manufacture at home from \$12 million to \$15 million, or between three and four times the value of the imports of these products." ¹

How the little family-operated shop of one day became the factory of another is strikingly illustrated by the story of Paul Revere. He started as a silversmith working at his own workbench. From this he branched out to a foundry in North Boston in which he produced bronze bells, brass cannon, nails, and spikes. But Paul Revere was not only a good craftsman, he was also possessed of scientific curiosity. This led him to explore the possibilities of rolling copper bar into sheets. Good ships were sheathed with copper which we imported from England because the process of rolling sheets was a secret possessed by only a few British workmen. To fathom this secret became Paul Revere's goal. In a letter to Harrison Gray Otis he reports:

It is the universal belief that no one in this country could make copper as malleable as to hammer it hot. I have farther found it is a secret that lay in a very few breasts in England.

I determined if possible to find the Secret and have pleasure to say that after a great many trials and much expense I have gained it.²

Congress advanced \$10,000 to Revere to put his ideas into practice. In 1801 he established at Canton, Massachusetts, a plant for rolling copper sheets. This was an important first step in the development of the copper industry in the United States.

Out of New England shipbuilding has grown an industrial progression which is an interesting example of the chain-effect in business. The development was roughly as follows: New England shipbuilding; production of brass parts for ships' gear and copper sheathing for ships' bottoms; accumulation of small pools of capital; little shops for converting copper and making hardware became large factories; because of this interest, Boston capital opened our first copper mines, in Michigan; later New England took the lead in financing the development of the great copper mines of the Far West.

While many little workshops such as Paul Revere's were growing into larger businesses, certain gentlemen of charitable intent turned to the idea of a central workshop where the unemployed could be put to work under supervision as a means of relieving the needy. The "Pennsylvania Society for the Encouragement of Manufacture and the Useful Arts" and the "New York Manufacturing Society" were organized. The purpose of the latter was stated to be "furnishing employment for the honest and industrious poor." Whether it accomplished this result to any great degree is uncertain. However it did provide work, for a short time, for one honest and industrious person who refused to remain poor. This was Samuel Slater who might well be called the father of the factory system in the United States.

As a young man in England, Slater worked in one of the mills where the Arkwright process for power spinning of cotton yarn was in operation. This process, combined with other technical improvements, had put England way ahead in the textile field. In an effort to maintain this advantage the whole Arkwright process was shrouded in mystery and the export of the new machinery prohibited. Businessmen in this country were, of course, generally aware of these developments and tried in every way to find out what made the wheels go round in the Arkwright mills.

Slater, as an operative in one of these semisecret plants, sensed an opportunity. It might not be possible to export the machinery. It might be



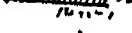
New York December 10th 1812

Major Paul Revere Esq.

Gentlemen

please to order

and to me as soon as possible the following plates of

copper 24 " 5 feet by 3 one quarter inch thick...  1/4
24 " 5 " 3 one eighth inch...  1/8
32 " 5 " 3 one eighth inch...  1/8

2000 rivets well forged and fitted to the
being wish you will please to take care that the
which shall be the best of copper and I hope such
large orders being given you will furnish it at the
lowest possible price and in the shortest time
please to send the first 24 plates as soon as done
and on the receipt of this letter say when they can
be shipped

Yours gentleman Respectfully given
most Obedient Robt Fulton

$$\begin{array}{r} 230 \\ 24 \\ -920 \\ \hline 460 \\ 5520 \end{array}$$

$$\begin{array}{r} 460 \\ 20 \\ \hline 11200 \end{array}$$

$$\begin{array}{r} 15 \quad 2 \quad 8 \\ 24 \\ \hline 360 \\ 13112 \end{array}$$

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Facsimile of letter in which Robert Fulton orders copper sheets from Paul Revere for making a boiler on one of his steam boats
Courtesy of the Revere Copper and Brass, Incorporated

possible, however, for a workman with a flair for mechanics and a retentive memory to take his knowledge to America. Accordingly, not long after the final adoption of the Constitution and just as new business horizons were opening up in the little republic, there stepped ashore one day at the port of New York a young man with big ideas. Carefully locked in the brain cells of Samuel Slater were the secrets of the Arkwright process of power spinning. His first employment with the New York Manufacturing Society did not last long. One gathers that Slater was not impressed with his business prospects in this enterprise. Shortly we find him casting about for another connection.

At this point we again meet an old friend, Moses Brown of Providence, of the well-known quadrumvirate, "Nicky, Josey, Jack, and Mosey." It seems that Moses Brown together with several members of his family had been experimenting with textile machinery in an attempt to fathom the Arkwright process. They had not been getting anywhere. Slater wrote asking for a job. Moses Brown answered Slater's letter immediately, informing him that if he would come to Providence, "we should be glad to engage thy care so long as they can be made profitable to both, and we can agree." * Slater accepted this offer, and in April, 1790, signed a contract of partnership with William Almy and Smith Brown. The latter gentlemen were both relatives of Moses Brown and were associated with him in business. By the terms of the agreement Slater covenanted that he would erect and put into operation one hundred spindles to be driven by water power. As compensation, he was to receive one-half of the profits while Almy and Smith Brown would split the other half.

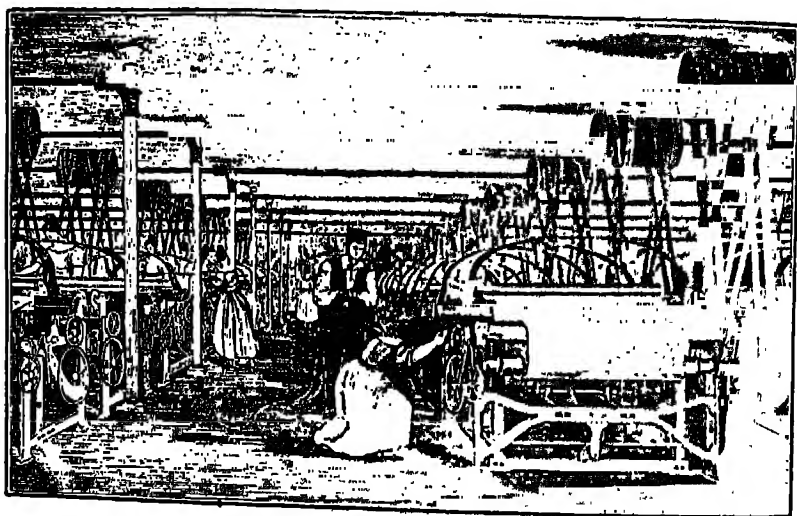
Success was not immediate. Slater toiled, experimented, adjusted, and finally got the plant going—the first practical power-operated spinning frame in America. Cotton yarn was produced at a fast rate and at a fraction of the cost of hand-spinning. This gave New England its textile industry and marked the practical beginning of our factory system.

Once worked out the process and machinery were not difficult to reproduce. As Slater had brought the Arkwright idea to America, so workmen trained in his plant spread the process to other cities and to other capitalists.

Significant as this development was, events were soon to occur which caused this small brooklet to become a river and revolutionise the American economy. About three years after Slater started in Pawtucket, Eli Whitney perfected his cotton gin. Previously a laborer could clean by hand only a pound or so of cotton per day. Now one of Whitney's gins, when hooked up to a small amount of power, could clean in the same time several hundred to a thousand pounds. The effect was to touch as with a magician's

wand the economy of the South as well as that of New England. The Whitney gin opened a commercial outlet for the short staple cotton of the southern uplands. At the same time it gave the new textile industry of New England an abundant supply of cheap raw material.

Then came the embargo in 1807, nonintercourse with England in 1809, and the war years 1812 to 1815, during which periods practically all importations of English cotton goods were stopped. Our new little spinning mills were given a golden opportunity to sell their products in the local market. "In 1807 there were fifteen cotton mills running 8000 spindles and producing 300,000 pounds of cotton yarn annually . . . in 1815, 500,000



Interior view of early textile factory

Memoir of Samuel Slater by George S. White

spindles gave employment to 76,000 persons with a pay roll of \$15,000,000 per year."

Up to this time, although Slater had produced yarn on a quantity basis, the weaving of cloth was still done on hand looms, mostly in farmer households. Finally in 1814, Francis Lowell did for cotton weaving what Slater had done for cotton spinning. He perfected the application of water power to the weaving process. Lowell then went one step further and built a fully integrated cotton cloth mill at Waltham, Massachusetts. Here for the first time in America the operations of spinning, weaving, and printing were carried on in one plant.

These fortunate events all occurred within a period of twenty-five years.

The capital accumulated by the merchant and fishing interests of New England began to flow into the textile business. This new opportunity for venture capital was particularly opportune because our shipping and foreign trade were beginning to suffer from continued discrimination by England after the War of 1812. Little textile mills were opened in many communities. The nation, especially New England, was thenceforward to travel at an accelerating pace along the road of an industrial economy.

When we approach the year 1820 we reach the point where business developments in the west must be reckoned with. Although it was not until after the Revolution that trans-Alleghany settling really started, progress in the newly opened territory moved at a quick pace. By 1815 Pittsburgh had become quite a manufacturing center and was already referred to as the "Birmingham of America." The main route to this rapidly growing frontier city was west from Baltimore or Philadelphia. Settlers would buy farm horses and a Conestoga wagon, load up with supplies and equipment, and then struggle patiently across the mountains to Pittsburgh. Here those who wished to press on further could secure a boat and float down the Ohio River until they found the land on which they wished to settle.

Pittsburgh thus became at once a terminal and an embarkation point. Here East met West. A growing stream of settlers flowed in, some to stay, others to continue on westward. Obviously this was a good place to do business. Merchant traders from Philadelphia and Baltimore opened branches or established agencies at Pittsburgh. The course of trade was somewhat as follows:

Merchandise would be brought overland from coastal cities. This would be exchanged for the products of Pittsburgh and the Ohio Valley which included iron, iron utensils, hemp, rope, bottles, whiskey, bacon, and ham. It was not economical to send these back overland to the coast. Instead, the law of gravity was allowed to do the work. The goods were placed on flatboats and floated down to New Orleans, a trip which took about forty-five days. Here small portions might be sold for cash. The balance would be exchanged for sugar, indigo, and cotton which would then be shipped by sea to Atlantic coast ports. The round of trade was complete. Thus were the Alleghanies circumvented.

We are indebted to a contemporary chronicle for an interesting description of Pittsburgh of that day:

This great manufacturing town contains from eight to ten thousand inhabitants. . . .

Among its manufactories are the following:

- 1st, A steam rolling and slitting mill, . . . of seventy horse power on Evan's plan.
- 2d, A steam flour mill, of twenty-four horse power, on Evans plan . . .
- 3d, A steam paper-mill . . .
- 4th, Steam cotton factory, of twenty horse power, on Watt & Bolton's plan.
- 5th, A steam woolen factory . . .
- 6th, A wire manufactory, propelled by steam.

Steam engines—There are three extensive establishments in this place for the making of steam engines:

- 1st, The "Pittsburgh Steam Engine Company," construct them on Evans' Plans. . . . The hands employed by this company are about one hundred, generally. Many of the anchors were made by this company for Commodore Perry's squadron on lake Erie.
- 2d, Bolton and Watt's plan, improved, are made, extensively, by Thomas Copeland.
- 3d, The "Mississippi Steam-boat Company," on Fulton's plan.

Glass—There are at this place two white and three green glass-houses. This article of manufacture has become one of the staples of our trade. The amount of glass manufactured, annually, is valued at \$200,000 . . .

Air-Foundries—There are in Pittsburgh, three large and extensive air-foundries, where are cast all kinds of hollow-ware, castings, cannon, cannon balls, smith's anvils, sad irons, steam-engine castings, & c . . .

Lead—Two white and one white and red lead factory, to which are connected chemical laboratories.

Rope Walks—Three large and extensive rope walks, which make all kinds of rope, twine and cordage. At one of these walks the principal part of the cordage for Commodore Perry's fleet was made . . .

Three Banking Houses—viz. the bank of Pittsburgh; the Farmer's and Mechanics' bank of Pittsburgh; the office of discount and deposit, a branch of the Pennsylvania bank.⁵

While all these figures now seem diminutive, they were not so at the time. Pittsburgh with a population of eight thousand was a large city. A steam engine company with 100 employees was a substantial manufacturing unit. The diversity of products was particularly good for an interior city. These early accomplishments of the city on the Allegheny constituted an auspicious augury of the events of the next century—the industrialization on a fabulous scale of this western country.

XI.

OLD LADY ERIE

THE new nation was in process of opening rapidly an inland empire of fabulous natural resources. A great migration of European farmers and workmen started toward the new territories. As if timed by our needs, applied science gave us the transportation required to exploit these inland riches. Within a quarter of a century we perfected the lock system of canal construction for carrying boats over grades; river steamboats; and steam locomotives for overland trips. Then as new demands arose for iron in quantity we worked out smelting with coal in place of the expensive, restrictive charcoal process. We uncovered large beds of iron ore and coal, accessible to our centers of population.

Thus the infant Republic of such uncertain future in the 1790's was shortly to find itself with undreamed-of riches in its new fertile western lands, a rapid growth in population and the age of mechanical power just coming in to enable it to realize on this natural wealth. The Genii of Good Fortune were in perfect step, laden with bounty.

This consuming interest in the opening of the West and the development of its trade resolved itself into a great battle among the old port cities of the eastern and gulf seaboard. Merchants in Boston, New York, Philadelphia, Baltimore, and New Orleans strove mightily to channel expanding commerce for the benefit of local interests. The businessman's Promised Land was no longer beyond the seven seas. It was just over the hump of the Alleghanies.

In this commercial rivalry the port of New York won supremacy. The determining factors for its success were the physical characteristics of the region. A large and well-protected harbor is joined to the back country by the deepwater Hudson River which penetrates well inland. From the upper Hudson, the Mohawk Valley strikes westward to provide the most practical pass through the Appalachian mountain system in its whole range from the St. Lawrence to Alabama. The Indians traveled and traded over this route. There followed in picturesque succession trappers, trad-

ers, and settlers. Then the Erie Canal and the New York Central Railroad. Thus New York City's career as the greatest port of the Western Hemisphere may be traced back to some remote convulsion of Nature which caused receding icecaps to carve the Mohawk and Hudson Valleys into a natural highway from the coast to the Great Lakes.

In the early 1800's the port of New York was something of a turbulent upstart. Its rapid growth and the increasing wealth of its merchants challenged the prestige of other ports on the Atlantic such as Salem, Boston, Philadelphia, and Baltimore. In the 1820's, events took place which were to make this former Dutch settlement the uncontested leader and greatest business center of the New World. Its population rose from about 70,000 in 1800 to almost 800,000 in 1860. Its harbor became the gateway through which flowed the grain, lumber, and livestock of the midwest into world markets across the Atlantic. A swelling tide of miscellaneous imports surged back to provide for the ever-increasing demands of the western settlers. Prosperity bred prosperity. Trade engendered trade. Much of the cotton of the south was shipped through the port of New York or financed by its merchants. The outlines of the modern metropolis began to take shape. The kernel of this success story lies in the construction of the Erie Canal.

The possibility of a commercial water-route to the West had long germinated in the minds of restless New Yorkers. In connection with Indian trade, Cadwallader Colden in 1724 had reported to the Governor that "Goods are daily carried from this Province to the *Sennekas* as well as to those Nations that lie nearer, by Water all the Way, except three Miles (or in the dry Season five Miles), where the traders carry over Land between the *Mohawks*-River and the *Wood Creek*, which runs into the *Oneida Lake*, without going near either St. Lawrence River or any of the *Lakes* upon which the *French* pass." ¹ In 1783 George Washington, who always had an absorbing interest in the opening of the West, made a trip along the Mohawk River to Wood Creek. He was deeply impressed with the possibilities of this route. In the next few years public opinion in New York State became alive with expectations.

The situation called for someone to translate vague desires into action. The person who plays such a role in the economic drama is known as a promoter. Much aspersion has been cast upon those who follow this pursuit because, under the law of averages and in view of the frailty of human judgment, many promotions come to nothing. However their work is at the very heart of the free enterprise system. We can well absorb the losses of ninety-nine small failures if the hundredth case results in an Erie Canal, a Ford Company, or a Pan-American Airways. We have now to

record how a promoter, endowed with imagination and initiative, seized upon the elements favoring a New York waterway to the West and forced the action which led to the construction of one of the nation's great arteries of trade.

Elkanah Watson, a New Englander residing in Albany, took a practicable first step by enlisting the aid of one of the country's most renowned citizens, General Philip Schuyler. Together they secured the support of Governor George Clinton. Accordingly in 1792 the New York State Legislature passed a bill incorporating two companies to carry out the Watson proposal. These were the Western Inland Lock Navigation Company and the Northern Inland Lock Navigation Company. The former was dedicated to the purpose of "opening a lock navigation from the now navigable part of Hudson's river to be extended to Lake Ontario, and to the Seneca lake," while the Northern Inland Lock Company was chartered for "the like purpose, from the now navigable part of Hudson's river to Lake Champlain."²

The arrangement with the State was that after the company had expended \$25,000, the State would grant an additional \$12,500. Accordingly, there were offered for public subscription 1,000 shares of stock at \$25 per share. The sale proved difficult and even when the stock was subscribed some subscribers failed to make payment. The project still seemed visionary. However after many vicissitudes a section of the canal was completed from the Mohawk River to Wood Creek.

Unexpected problems now beset the new enterprise. Timber walls of the locks had to be replaced with brick and finally with stone. The trouble was that no one in America yet understood the problems of canal and canal lock construction. Watson and his associates were blazing a new trail. Their greatest error, however, was more fundamental than matters of construction. The project was based on using the navigable portions of the Mohawk River and Wood Creek. This did not work because under frequent conditions of flood as well as of low water navigation had to slow down. After some years of heartbreaking experience it became evident that the only practicable solution was an artificial waterway, the water levels of which could be controlled. Further construction was abandoned. The Western Inland Lock Navigation Company was a failure, but a glorious one.

The businessmen and political leaders of New York were not discouraged at this setback. The experience only spurred them on to further adventure. The stakes were high. Many settlers had gone to western New York, Ohio, and Indiana. It was costing these people upwards of \$100 per ton in freight charges to secure articles of necessity from Atlantic ports.

High transportation costs limited overland shipment of bulky products like grain and lumber to distances of not more than twenty-five or fifty miles. Therefore when the projected Erie Canal gave promise of reducing freight costs to tidewater by over 90 per cent, one can understand the enthusiasm of the western farmers and New York businessmen. They saw a vision of vast trade possibilities and a growing stream of new settlers.

Accordingly, under the leadership of DeWitt Clinton and other prominent citizens, the canal promoters pressed forward with their project for a separate waterway from Albany to Lake Erie, a distance of over 350 miles. As in the case of its predecessor, locks were to be used to surmount the grades of the route. Viewed simply as a feat of the imagination, this conception was quite an accomplishment. When considered in its practical aspects, it was breath-taking. Bear in mind that the Western Inland Lock Navigation Company's completed project between Mohawk River and Wood Creek was only a few miles long. Let us credit the promoters of the new canal above all else with courage.

The first problem to confront them was financing. Their preliminary estimates indicated a cost of \$4,500,000. To raise this great sum on the credit of a private company was out of the question. Congress was petitioned but President Madison dashed the hopes of the Erie's sponsors by vetoing a bill which would have apportioned "among the several states, for constructing roads and canals, the dividends from stock owned by the United States in the National Bank." A loan was solicited in Europe without success. The only course left was to use the credit of the State of New York. The mere thought of such a gamble caused vehement protest from the more conservative taxpayers who predicted that this could only result in State bankruptcy. Nevertheless the New York legislature authorized a loan for the purpose of building the canal. To service this debt, taxes on salt, steamboat passengers, canal tolls, lotteries, and on certain lands near the proposed route were to be set aside.

It is almost impossible for us to conceive what a stupendous undertaking and adventure into the unknown was this proposed Erie Canal. In addition to the great distance involved, substantial grades must be overcome and the canal carried by aqueduct over natural waterways. As we have already noted, Americans in those days had no real engineering knowledge of canal and lock construction. The contractors of that time had no great power shovels capable of taking a roomful of earth in one bite. They had no tractors, no trucks, no bulldozers, and no air-driven rock drills. The workers on the Erie had only about the same tools that men had used in 2000 B.C. when it is reported the first Suez Canal was attempted.

Construction was carried on by letting contracts for small, separate sections of the canal. This meant that anyone who could muster some horses, plows, and a small group of farmhands had an opportunity to engage in digging "Clinton's Big Ditch." Construction progressed favorably. The American genius for resourceful solution of difficult practical problems was manifest from the outset. For example, in the report on the work for the first year, it was stated: "It has been ascertained that much labor in excavation is saved, especially in dry ground, by the use of the plough and scraper; and it is found that banks constructed in this way . . . are much more solid, and less liable to leakage, than those which are made after the European method with the spade and wheelbarrow." *

Ground had been formally broken for the great work on July 4, 1817, and for eight weary years the citizens of New York State watched impatiently as the canal inched its way slowly along. When finished it was 363 miles long and 83 lift locks had been built in order to attain the maximum elevation at Buffalo, some 566 feet above the Hudson tidewater level. The width of the canal was 40 feet at the top and 28 feet at the bottom. The depth of the water was only 4 feet but this was sufficient to permit the passage of boats of at least 30 tons. Horses and mules moving along the towpaths provided the power for pulling barges from one end of the canal to the other.

This separate waterway was so constructed that the water levels were under control except for rare occasions of extreme flood. There was an aqueduct which carried the canal and its towpath across the Genesee River. This was about 800 feet long and viewed alone was a major achievement. Also, in addition to the regular locks by which boats were to be lifted up grade, two special locks were built, one at Utica and one at Syracuse. In these, by measuring the difference in the amount of water displaced by a boat when empty and when loaded, the weight of a boat's cargo was calculated. Tolls were levied accordingly.

At long last, on October 26, 1825, about one hundred years after Cadwallader Colden had pointed out the possibility of such a waterway, the Erie Canal was opened. The inaugural ceremonies for what was then referred to by many as the "Grand Canal" were as expansive as the project had been ambitious. Argosies of canal boats, with bands, fireworks, and much firewater, proceeded from Buffalo through to New York. The citizens of the Empire State were thrilled beyond description. As events soon proved, their enthusiasm was not misplaced.

The Erie Canal was a success of dramatic proportions. At one moment our countrymen gazed westward to a limitless inland territory accessible only by canoe or pack-train. Then suddenly there was the canal, a great

new artery of "rapid" communication for settlers pouring into the farthest reaches of the country it served. The time of travel through to Buffalo was reduced from three weeks to six days. Freight costs from Buffalo to tidewater dropped from around \$100 per ton to below \$10. The western pioneer farmer was now in touch with the markets on the Atlantic. His shipments produced a profit. Grain, flour, lumber, whiskey, salt, and peltries flowed in an ever-swelling volume from the Great Lakes area through the canal, down the Hudson and out of the port of New York to the markets of the world. Where before there had been only an occasional flatboat on the Mohawk, now it was no unusual sight to see fifty big canal boats pull out each day from Albany for Utica, Syracuse, Rochester, and Buffalo. The production of wheat and wheat flour grew more rapidly than that of cotton, the miracle crop of the South. Trade engendered industry and industry begot more trade.

From a financial point of view the Erie Canal was outstandingly successful. This, of course, is simply another way of measuring its contribution to the economic progress of the nation. The original cost of construction of the Erie and its smaller sister, the canal from the Hudson to Lake Champlain, was about ten million dollars. Within eight years tolls alone were running at more than \$1,300,000 per year with a net income after 1830 of approximately one million.* By 1836, eleven years after its opening, the debt had all been retired and the taxes which had been separately pledged were returned to the general fund of the State.

The spectacular success of the Erie started a boom in canal building. Other large eastern ports began at once to seek western canal routes, each for its own account. In addition, connecting canals were projected to tie together rivers near the coast and in the newly opened west. It is to be recalled that the canal was in that day a means of rapid transportation as well as one of low operating charges. Consequently every community of any importance began to conceive of its own future largely in terms of canal facilities.

The ballooning western trade over the Erie Canal was balm to the businessmen of New York but poison to those of Philadelphia. For a decade or so the latter had been planning canals and had actually built two along the Schuylkill and Delaware Rivers. Obviously now they too must have a Grand Canal with which to seek the trade of the rapidly growing western country. Unfortunately for those old traders of the Quaker City the retreating ice-cap of the glacial age left them no natural hallway such as the Mohawk Valley in New York State. To go through to Pittsburgh and the Ohio Valley was a case of going up and over the mountains.

However the initiative and enterprise of these Philadelphia business-

men was equal to the challenge. They projected and partially completed a transportation system later to achieve fame as the "main line." This consisted of a railroad from Philadelphia to Columbia on the Susquehanna and a canal up the Susquehanna and Juniata Valleys to Hollidaysburg at the foot of the mountains. Here, instead of surmounting the grade with canal locks similar to those on the Erie, a series of inclined planes with tracks was built. The canal boats were floated onto wheeled cradles and the combined load was pulled out of the water and up tracks on the inclined planes to the portage railway which led through Blair's Gap to Johnstown. Once over the mountains the boats were returned to their natural element and floated down to Pittsburgh. In spite of the zeal with which this enterprise was pushed it never attained success like that of old Lady Erie. The cost of operating the "portage railway" was high. New York's growing supremacy was not seriously threatened.

Responding to this same westward impulse, the citizens of Virginia and Maryland undertook the construction of the Chesapeake and Ohio Canal. This was the most ambitious of all such schemes because it involved not only crossing the Alleghanies to the Ohio River but also a canal from the Ohio to the Great Lakes. Had the project been completed, the produce of the Great Lakes basin would have been brought to the ports of the Chesapeake Bay. The enterprise went through many vicissitudes, consumed a large amount of capital, and never got further west than the eastern slope of the Alleghanies.

The frenzy of canal building was of short duration. Starting about 1825 it had begun to taper off by 1840. It has been estimated that by 1850 some 3700 miles of canal had been constructed in various parts of the country. Practically all of these projects had been built with state funds. Private capital participated only in a small way. In some states the result was a veritable debauch of public spending. The boom was brought to a close by the business disturbances which began in 1837. It then became apparent that many of the canal projects had been based more upon roseate hopes than practical traffic potentialities. This whole period of canal construction may be regarded as a transition stage leading up to the coming in of the steam locomotive—the great era of railroad transportation.

XII.

THE STEAMBOAT GOES WEST—

COTTON IS KING

ABOUT the time the Western Inland Lock Navigation Company was trying to push a canal through the Mohawk Valley in New York, settlers in Pittsburgh, Louisville, Cincinnati, St. Louis, and New Orleans were pressing plans of an entirely different nature. These were based on the adaptation of the newly invented steamboat to the extensive waters of the great Mississippi system. The early pioneers who had crossed the Wilderness Road or National Turnpike to settle in the Ohio and Mississippi Valleys looked to these rivers to provide their communications to world markets.

For many years flatboats had been floating downstream with corn, flax, hemp, hogs, and whiskey. But there was no practical means of getting return cargoes upstream. One-way traffic was highly unsatisfactory. There was little incentive for the farmer to ship his produce if he could not get desperately needed equipment and household goods in return.

About this time, in the city of Paris, a meeting took place which was to have important consequences for the settlers along the Mississippi and Ohio. Robert R. Livingston of New York had been sent as our Ambassador to France and in 1803 had assisted in negotiating the Louisiana Purchase. While in Paris, Livingston chanced to encounter another American residing there, Robert Fulton. Both were enthusiastic believers in the practicability of applying steam power to boats. They built and ran a small steamer on the Seine.

When they returned to America this congenial partnership was continued. The world knows the result. In 1807 Fulton sent his *Clermont* up the Hudson and proved incontestably the practicability of steam navigation. Livingston and Fulton secured from New York State a monopoly for the use of steamboats upon the navigable waters of the State.

In the light of Livingston's interest in Louisiana it was quite natural

that their thoughts should turn next to the possibility of introducing steamboats on the Mississippi. Fulton's success with the *Clermont* had aroused hopes among the settlers along the western waterways. Sensing that the time was now ripe, Fulton, Livingston, and Nicholas J. Roosevelt laid plans for a business deal that might have made them all as rich as Croesus. As consideration for developing and maintaining steamboats on the Mississippi and Ohio River, they planned to ask for a monopoly from the states which would benefit.

Nicholas Roosevelt was dispatched to Pittsburgh and New Orleans to promote and activate the enterprise. Upon plans prepared by Fulton, the first steamboat of the western waterways was built in 1811 at Pittsburgh. The *New Orleans* cost about \$38,000. It was 116 feet long with a 20-foot beam.¹

The entire population of Pittsburgh—to the last man, woman, and child—turned out to see the ceremonial departure of this first steamboat to try navigating the western waters. It is related that the acclaim for the intrepid entrepreneur, Roosevelt, was considerably tempered by concern with another fact. This unpredictable stranger was taking with him his young wife who, it was obvious to even the most casual observer, was shortly to bless the country with another Roosevelt. Some persons proposed that he be forcibly restrained from risking the mother and the child-to-be on this hazardous venture.

The fourth night after starting the *New Orleans* lay off Louisville. Suddenly in the peace of the night steam pressure popped off the boiler's safety valve with an unearthly racket which reverberated over the quiet countryside. Indians and whites alike rushed to the river thinking the comet of 1811 had fallen into the Ohio River. The Indians explained the phenomenon as a "fire canoe." By the whites, the only explanation offered was that it was not a comet—it was a Roosevelt.

As the fire canoe progressed downstream, the little party was beset by a series of earthquakes which caused Old Man River to shift around considerably in his bed. One night they anchored on the down river side of a small island. When they awoke in the morning, the island was gone, having been washed away by a shift of the river in the night. Notwithstanding all the difficulties of navigation, the *New Orleans* and her crew, both present and prospective, finally made the city of New Orleans. Although on a short run Roosevelt demonstrated the capacity of his boat to go upstream against the current, he did not attempt the voyage back to Louisville.

Meanwhile the Fulton-Livingston-Roosevelt group had secured a monopoly from the State of Louisiana for steamboat navigation within that

state in accordance with their original plans. Things looked rosy indeed as they pictured a growing volume of upriver produce bringing tribute to their coffers. At this point competition appeared in the form of Henry Shreve and his steamboat *Washington*. This craft, built at Wheeling, succeeded in 1817 in making the round trip between Louisville and New Orleans in the remarkable time of forty-one days. When the *Washington* next returned to New Orleans, the New York interests had her seized by the sheriff in a suit to enforce their monopoly.

Here was a direct issue on a question of vital importance not only to the people of the Mississippi-Ohio Valley but to the commerce of the nation. The Livingston-Fulton group had monopolies for steamboat operation in the two great ports of New York and New Orleans. Moreover the practice was spreading. Georgia, Massachusetts, New Hampshire, and Vermont had each granted some sort of exclusive concession for navigating steamboats. Other states, notably New Jersey and Connecticut, were combating the monopolists. The principle involved was basic. It cut to the very roots of our business system. By these state grants, commerce at all of our ports and over our great waterways could be made to pay tribute to local special privilege. Such an outcome would be a denial of one of the main purposes of union—freedom of commerce.

Citizens of New York and New Jersey locked horns over the Livingston-Fulton concession and took the case to the United States Supreme Court. In the decision which was handed down in the case of *Gibbons v. Ogden* Chief Justice Marshall and his associates struck a blow for the freedom of trade. They ruled that the state monopolies for steamboat operation on our navigable waterways must give way before the power of Congress to regulate interstate commerce. Said Associate Justice Johnson, "If there was any one object riding over every other in the adoption of the constitution, it was to keep the commercial intercourse among the states free from all invidious and partial restraints . . ."

Henceforth our great ports and navigable waterways were to be open to all, subject only to rules of Congress. On western rivers, Shreve and the competitive system had won out. At once there sprang up that picturesque era of steamboat transportation on the Mississippi and its tributaries which did so much to open the West. New Orleans became in a few years one of the most colorful and active marts in the world. The sleepy old Spanish-French-American city developed into a thriving business and banking center, second only to New York in importance.

This prompted many people of the South and West to believe that New Orleans instead of New York would become the business center of the continent. That this hope failed to materialize was due to various factors.

In the first place, the upper Midwest by reason of its soil and climate was ideally suited to the production of staple crops, challenging even to King Cotton. Our grains were needed in the British Isles as well as on our own east coast. For these products and other foods, the Great Lakes-Erie Canal-Hudson River system offered a more direct route to markets than the Mississippi.

Then the great majority of immigrants came in through the port of New York thence to spread westward by way of the Erie Canal to settle the rich farming areas to which it led. Moreover our Atlantic ports had an early lead in imports. It was quite natural for European manufactured goods to funnel in through such gateways. These factors were supplemented by an aggressive spirit among eastern businessmen as well as by their liberal credit facilities.

By 1851 it is estimated that the Hudson was carrying 60 per cent of the surplus products of the western country. Bitterest pill of all to New Orleans was the fact that much of the southern cotton crop found its way coast-wise up to New York, there to be financed and reloaded for England. This growing business ascendancy of New York City cast a well-defined shadow of events to come. The North was outstripping the South in economic growth and in the accumulation of that dynamic element—venture capital.

While a divergence of viewpoint between interests of the North and South was becoming more apparent, there were few who recognized its true significance. To the South during the period from 1820 to 1860 cotton was not only King but King by Divine Right, clothed by his subjects with a doctrine of economic infallibility.

It seemed to the cotton planter a system ordained by the gods of good fortune. He paid little (he thought) for his labor; cotton sprang out of the soil like heat from the sun. The great markets of the world reached across the seas to his very threshold for the product. It was a concurrence of favorable circumstances which might have deceived anyone. It did just that. There was, however, more than one fly in this otherwise perfect amber.

In the first place, the southern planter did not grasp the remote consequences of a large-plantation, slave-labor economy. This system discouraged the immigration of enterprising small farmers and artisans. The rugged pioneer of independent thought with nothing in capital but his own willingness to sweat and toil and who wished to carve out his own proprietorship was not encouraged by conditions in the South. The large planters grabbed the choicest lands and the little fellow was constantly pushed into marginal areas. The small white farmer found himself com-

peting with slave labor without the capital to purchase slaves. Putting it another way, a sizable amount of capital was required in the South before one could join the system. Planter control was absolute.

On the other hand, in the North a young man could become a small proprietor and a member of the system with nothing but an idea and a strong back. His competition was from other small operators like himself. In consequence, the North secured a plentiful supply of hard working, intelligent, thrifty, and ambitious labor. Such is the lifeblood of an expanding enterprise system. It was unfortunate for the South that just at this time the tempo of the industrial revolution was accelerating. The application of power to manufacturing processes was about to produce wealth in quantities staggering to the imagination. The South, by denying opportunity to the impecunious but ambitious white laborer and by adherence to the plantation-slave system, blocked itself from participating fully in the great economic advance.

Furthermore, the southern planter failed to realize the true nature of the business he was running. In effect he was marketing a rapidly depleting capital asset. Each year as the big bales bursting with cotton rolled down onto the decks of the river steamboats, the planter thought he was selling only his cotton. Really he was selling cotton plus a certain percentage of his land. As a crop, cotton was a land destroyer. It was necessary constantly to plant new land. If out of the yearly receipts for cotton the planter had set aside a sum in cash with which to buy more land he would have found that instead of making money he was frequently operating in the red. What he really needed was modern cost accounting. To make matters worse he attempted to make good his hidden losses by borrowing from the agents who purchased his crop. Interest charges were added to his other expenses and he came under heavy obligation to northern and English capital.

There was another important factor—the great expense of slave labor. The cotton planter, as well as many others, failed to realize the true cost of this system. The initial investment in field hands kept mounting as new acres were planted faster than slaves became available. Around 1840 a field hand might be bought for about \$500. By 1860 the price had risen to anywhere from \$1200 to \$2000. At one time it has been estimated that one thousand acres of cotton land might be acquired for \$10,000 but that the necessary slaves would cost \$50,000.³

One would like to know, of course, how large was the over-all investment of capital in slaves. In 1860 the slave population was about four million. Of these it is not known how many were effective field hands. If a ratio of one in five is taken, the market value of the field hands alone, figured

at \$1200 per head, would have been around \$960,000,000. Some estimates indicate that the total value of all slave property may have been as high as two billion dollars. These figures must be taken cautiously but they at least serve to indicate the large amount of capital tied up in slaves.

Added to the high investment in the slave himself was the cost of his quarters. Then in the expense account must be figured food and clothing for him and his family. While the birth rate was high, so were losses due to deaths and runaways. The productivity per hand was low and costs of supervision great. Actually, when a balance is struck, we find that the labor cost under this system instead of being low was in fact substantial.

With all of its basic weaknesses we must recognize for the cotton system its immeasurable contribution to the business of the nation and the world at large. For long years cotton was our greatest export. It enabled us to build our first factories in the North which in turn created new pools of capital seeking further investment. Likewise the demands of the cotton plantations provided a market for the corn and livestock of the upper Mississippi. Cotton was the raw material which enabled England to become the great world merchant of cotton textiles. The coming in of cheap cotton cloth changed the clothing habits of generations. This vegetable fiber was not merely a southern crop, it was a resource of international significance.

XIII.

THE IRON HORSE STARTS OVERLAND

EVEN as the Mississippi River sprang to life as a transportation system with the advent of the steamboat, a new enthusiasm seized the country. Railroad building became a national obsession. The young, growing country was everywhere experiencing the need for improved communication. Businessmen were thinking in terms of a greatly expanded volume of trade. The application of steam and water power to manufacturing processes had multiplied production. Markets must be broadened. Local distribution must evolve into national distribution. Popular imagination, already aglow with the opening of the West, became fired with a new thought. Transportation on rails might do for other communities what the Erie Canal had done for New York.

The railroad, as we now know it, did not burst suddenly upon our people. There was a short transitional stage between the turnpike system of horsedrawn vehicles and the revolutionary conception of steam railways. The first "railroads" to be promoted by the businessmen of that time were crude railways for horsedrawn carriages. At the same time there was developing in the minds of a few the notion that steam power could be applied to rail transportation.

The idea of using steam to motivate a vehicle was not new. As far back as 1786 Oliver Evans of Philadelphia had asked for the sole right to operate "steam carriages" in Pennsylvania and Maryland. Evans had actually demonstrated his theory. He had put wheels on a little steamboat with which he had been experimenting, and, much to the dismay of the startled populace, actually ran his astounding contraption through the streets of the Quaker City. If one were looking for the first automobile to be used in America, this Evans 1804 model might well receive consideration.

In the years leading up to the adoption of the steam locomotive, the outstanding exponent of the idea in America was John Stevens. He was so convinced of the vast possibilities of steam railways that he believed either the federal government or the states should in the public interest

control all railroads which might be built. Retarded by the War of 1812, he finally built and operated a miniature steam railroad on his estate at Hoboken in 1820. Then, in 1823, he secured a charter for a road from Philadelphia to Columbia, a distance of about 73 miles. While this startling proposal aroused much popular curiosity he secured no effective support, either public or private, and failed to raise the necessary capital. Critics argued that while it might be practical to operate a steam road of three miles in length, it was sheer folly to talk of one over seventy miles long.

Like all revolutionary ideas, the concept of a steam railroad was met not only with skepticism but with hostility as well. In turning down a request to use the school house to discuss a proposed railroad, a school board in Ohio commented as follows:

You are welcome to use the school house to debate all proper questions in, but such things as railroads and telegraphs are impossibilities and rank infidelity. There is nothing in the Word of God about them. If God had designed that His intelligent creatures should travel at the frightful speed of fifteen miles an hour, by steam, He would have clearly foretold it through his holy prophets. It is a device of Satan to lead immortal souls down to Hell.¹

As promoters of such a Satanic device, businessmen of Philadelphia and Baltimore were the most active. This was to be expected. Their canal projects to the West had not done too well. They were forced to watch with envy as the Erie channeled the wealth of the West through the port of New York. The vision of possible railroad operation was to them as a glimpse of Mecca. Accordingly "The Pennsylvania Society for the Promotion of Internal Improvements in the Commonwealth" was formed. Its sponsors dispatched William Strickland to England to study the latest developments in railroad construction. When the Strickland report was issued in 1826, it was a spark which exploded public imagination into action. From then on, for almost a century, railroad building was a dominant interest of the growing nation.

Following the Strickland report the enterprising merchants of Baltimore went into action. They launched the first public railway actually to get into operation. This was the Baltimore & Ohio Railroad, the "cornerstone" of which was laid by the venerable Charles Carroll of Carrollton on July 4, 1828. In his remarks on that occasion this distinguished nonagenarian showed a remarkable prevision of the significance of the event for he is reported to have said: "I consider this among the most important acts of my life, second only to my signing the Declaration of Independence, if even it be second to that."² Here was a man who had participated in launching a new era of political freedom now sponsoring an equally new

and important phase of economic freedom—that which railroad transportation was to bring.

The ultimate purpose of the Baltimore & Ohio Railroad was to put the businessmen of Baltimore in touch with that great artery of western trade, the Ohio River. For several years prior to 1827 they had been promoting the fabulous Chesapeake and Ohio Canal. When it was found that the canal would cost at least twenty-two million dollars, many of its most enthusiastic adherents dropped out. Among these was Philip E. Thomas, a Quaker merchant, who then took the lead in promoting the Baltimore & Ohio Railroad and became its first president.

At this point the citizens of Baltimore were split into two opposing camps: those favoring the canal and those sponsoring the railroad. Both projects were pushed forward and each secured state aid. Early in 1827 an Act of Incorporation for the Baltimore & Ohio Railroad was passed by the State of Maryland. A few months before, the Legislature of the State of New York had made a preliminary grant to the Mohawk and Hudson Railroad Company, later to become part of the New York Central.

The capital of the Baltimore & Ohio was to be three million dollars, represented by 30,000 shares at \$100 each, of which 10,000 shares were reserved for subscription by the State of Maryland and 5000 shares by the city of Baltimore. This project had every support that local enterprise could give.

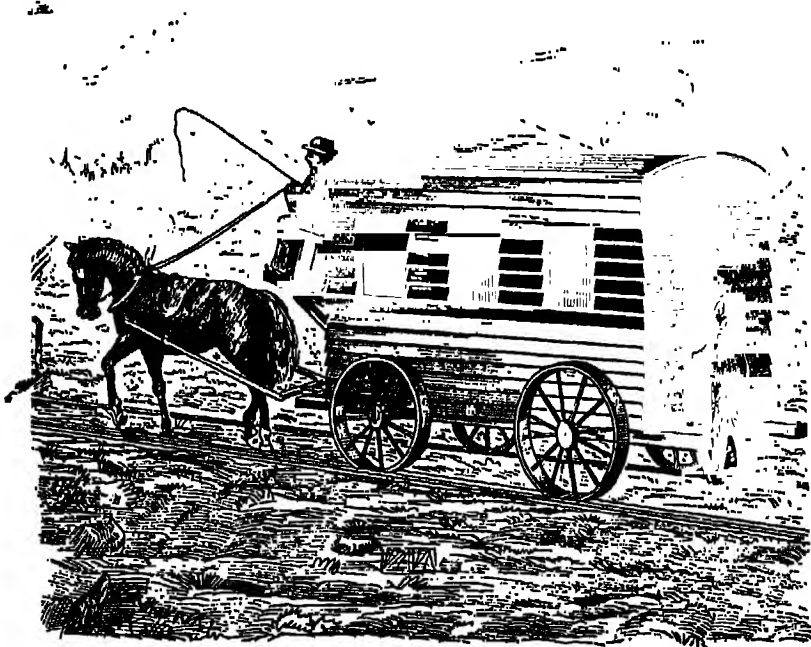
The public stock was offered for twelve days through the Mechanics' Bank in Baltimore, the Farmers' Branch Bank in Frederick, and the Hagerstown Bank. Subscription terms provided that \$1 per share was to be paid down and not over 33⅓ per cent of the subscription was to be called in any one year. Assisted by these reasonable terms and the public interest which surrounded the launching of this new project, the stock offering was highly successful. It might, however, be noted that Congress turned a deaf ear to importunities for federal aid.

The charter of the Baltimore & Ohio provided that the company might operate "all machines, wagons, vehicles, or carriages of any description whatsoever which they may deem necessary or proper for the purposes of transportation." It could charge tolls for the privilege of others using its rails. Although the directors had the benefit of the Strickland report, apparently "machines" was as far as they wanted to go in describing the new engine which was to revolutionize transportation.

The company had the right of eminent domain. The shares were tax exempt, as later for a time all of its property was to become. The president and directors were given broad powers including the right to borrow money and issue stock at par or better. The first board included Charles

Carroll, Philip E. Thomas, William Patterson, Robert Oliver, Alexander Brown, Isaac McKim, William Lorman, George Hoffman, Thomas Elliott, John B. Morris, Talbot Jones, and William Steuart.

In 1830 the initial section of the B. & O. was opened. This part ran from Baltimore to Ellicott's Mills, a distance of 13½ miles, a modest step toward the far off Ohio River. Horses provided the motive power although



It was literally horsepower which motivated our first rail cars
The Growth of Industrial Art, Benj. Butterworth, United States Patent Office

experiments were also being made with sails. It is reported that Thomas Earle of Philadelphia came forward with a unique proposal:

The same authority advanced the argument that in creating a railroad designed for operation by horse-power, it would be desirable so to build it as to secure a regular alternation of up-grades and down-grades. This expedient, he said, would enable the horses to jump aboard a car designed for their accommodation when the train was about to start down hill, thus saving the animal's strength and eliminating a waste of the motive power.⁴

Despite the necessity of commencing operations with horse-drawn cars, the B. & O. management lost no time in experimenting with one of the new steam "machines." In August of 1830 they tried out Peter Cooper's

diminutive one-ton locomotive *Tom Thumb*, which was about the size of a modern handcar. Although the *Tom Thumb* completed the trip from Elliott's Mills to Baltimore in about one hour, a mechanical accident caused it to lose out in the race against a horse-drawn car.

The Baltimore & Ohio next advertised for someone to build a three-and-a-half-ton locomotive capable of drawing 15 tons at a speed of 15 miles per hour. Phineas Davis of York, Pennsylvania, built *The York*, which was accepted as the road's first practical locomotive. Our engineers were beginning to understand the use of steam. By the fall of 1834 the company had eight locomotives in use and eight more on order. The new era of steam transportation in the United States had started.

This early operation of railroads was pioneering in its strictest sense. Our people struggled to adapt existing equipment and material without realizing that the railroad was something entirely new. In our first tentative steps we had simply taken the ordinary horse-drawn road carriage and adjusted its wheels and tires to operate on rails. This was all right as long as horses continued to be the power. However when the little steam locomotives began to pull these carriages at speeds of from 15 to 30 miles per hour and jerked them around sharp curves, the old wooden wheels just did not stand up. It was necessary to design and apply new ones of iron.

Then it became obvious that an ordinary carriage was inadequate in load capacity. To us the problem seems simple. In that day its solution called for real imagination and inventive genius. Considerable acclaim, therefore, was given to Ross Winans when he conceived and carried out the idea of putting three of the small carriage bodies together and mounting the whole on eight wheels. This was the birth of the modern railroad coach. For years thereafter Winans claimed a royalty of \$100 per year on each eight-wheel car used by American railroads.

The rail which the Baltimore & Ohio and other early roads employed was simply a thin strip of iron strapping perhaps $\frac{1}{4}$ to $\frac{1}{2}$ inch thick laid lengthwise on top of wooden rails which in turn rested on ties of one sort or another. These iron strips were apt to come loose at intersections, curl up into so-called "snake heads," and then penetrate through the carriage floors when the train ran over them.

From 1834 to 1853 the management of the Baltimore & Ohio fought a war on two fronts. One was to keep pressing ahead, laying new mileage, and at the same time maintaining operation over existing track. The other was to find large amounts of new capital during years of depressed business conditions.

Most of these early railroad operations were community enterprises. The State of Maryland and the city of Baltimore had accorded the Baltimore & Ohio substantial financial aid. Even this assistance was not always enough, however. As pressure for funds continued, President McLane of the B. & O. packed his bags and hied himself to London to see what he could do there with State of Maryland credit. It was a course of desperation. A more inopportune moment could hardly be imagined. Under the severe stress of the panic of 1837 some of our states had been guilty of debt repudiation and several had suspended the payment of interest. Among the latter was the State of Maryland. President McLane's heart must have been in his boots as he started ringing the doorbells of the London merchant-bankers. In the face of all these odds, he arranged a loan with Baring Brothers on the Maryland bonds. Subsequently a public offering of these 5 per cent sterling bonds at a price of 85 by Baring in the London market was a failure.

It was not until December, 1852, more than twenty-five years after its start, that the Baltimore & Ohio finally reached Wheeling on the Ohio River. Many difficulties had been overcome, not the least of which were financial. In 1850 the road had been again forced to seek funds in London. Baring Brothers once more came to its assistance, this time even taking 6 per cent bonds of the company, the proceeds of which went to buy English iron rails.

These deals with the Barings were doubly significant. They enabled the B. & O. to press westward. Equally noteworthy was the fact that they marked the beginning of that great inflow of English and Dutch capital which was to assist in building our far-flung railroad system. Without such aid from Europe down the years of the next half century, our progress would have been much less impressive. It was the venture capital of the merchants of London and Amsterdam, accumulated through centuries of foreign trade, which helped us to realize promptly on our great opportunities.

While the businessmen of Baltimore were learning the new science of railroading the hard way, citizens of other cities were also pioneering. From Charleston and New Orleans in the South to Boston and Buffalo in the North, short railroad lines began to spread outward from most large cities.

We of today cannot appreciate the degree of this interest because we were born heirs to modern transportation. Our grandparents, however, knew the frustration of being able to move people and goods only by horse-drawn vehicles. Their zest for opening new transportation horizons may be seen from the fact that while in 1830 the nation had but 40



**MOTHERS LOOK OUT FOR YOUR CHILDREN!
ARTISANS, MECHANICS, CITIZENS!**

When you leave your family in health, must you be hurried home to mourn a

DREADFUL CASUALTY!

PHILADELPHIANS, your RIGHTS are being invaded! regardless of your interests or the LIVES OF YOUR LITTLE ONES. THE CAMDEN AND AMBOY, with the assistance of other companies, without a Charter, and in VIOLATION OF LAW, as decreed by your Courts, are laying a

LOCOMOTIVE RAIL ROAD!

Through your most Beautiful Streets, to the RUIN of your TRADE, annihilation of your RIGHTS, and regardless of your PROSPERITY and COMFORT. Will you permit this? or do you consent to be a

SUBURB OF NEW YORK !!

Rails are now being laid on BROAD STREET to CONNECT the TRENTON RAIL ROAD with the WILMINGTON and BALTIMORE ROAD, under the pretence of constructing a City Passenger Railway from the Navy Yard to Fairmount!!! This is done under the auspices of the CAMDEN AND AMBOY MONOPOLY!

RALLY PEOPLE in the Majesty of your Strength and forbid THIS

OUTRAGE!

This broadside typifies the occasional hostility which our early railroads encountered

Courtesy of the New York Central System

miles of railroad, ten years later we had 2755 miles, and in 1860 some 30,000 miles, or about 50 per cent of the world's total.

Passenger traffic was the principal business of most of these early roads. Many of the lines were profitable from the start. It was this factor which stimulated a continuous flow of capital. Hence we find that, unlike canal construction, this great economic development was financed largely from

private sources although some of our states also participated. Interest was widespread among investors and within a few years after Baring Brothers made their first loan to the B. & O. "Yankee rails" became active securities in the London market.

Because of the large amounts of capital required, the chartered stock company of limited stockholder liability was the usual form employed in carrying on railroad enterprises in this country. In the early days these charters were always granted by special acts of state legislatures. Some of the grants carried exclusive rights. Most of them contained restrictive conditions. In certain instances passenger and freight charges were limited. Others provided that excess dividends would be taxable and in some cases dividends were limited to not over 10 per cent. On occasion, railroads might be permitted to do a banking business. Others were allowed to operate lotteries to raise capital. Various kinds of special clauses were inserted such as that in the charter to the Utica and Schenectady which provided that the road could not carry passengers until it had purchased at \$22.50 per share the stock of the Mohawk Turnpike Company, a competing form of transportation.

Most of the early roads were short lines serving as connecting links between neighboring communities. For example, while in New York State there were connecting railroad facilities from Albany to Buffalo, some eight different companies were involved. The handling of through business was inefficient, time-consuming, and costly.

Such a situation, of course, presented a unique opportunity for merger. It was not long in coming, activated largely by the prospect of competition from roads operating on a through single-line basis. In 1851 the New York and Erie had been put through from New York to Lake Erie. The Baltimore and Ohio now threatened to reach into the western country.

This situation was far from reassuring to the operators of the eight little railroads on the Albany-Buffalo run. They were not slow to see that such competition would cause their own stockholders to eat from a pretty lean trough. These New York State businessmen reacted promptly and put through the first large railroad consolidation.

The first step was to secure a special enabling act from the Legislature of the State of New York. Next a committee was appointed, with members representing each road, to determine the respective valuations at which the properties would go into the consolidation. After two months of struggle values were set based on comparative earnings. In July, 1853, the New York Central Railroad was formed. It assumed the underlying debt of each company and issued its own stock for the stock of each

of the separate railroads at valuations agreed upon. The consolidation agreement provided for:

Capital stock	\$23,085,600
Assumed indebtedness	1,956,475
Debt certificates	8,857,091
	<hr/>
	\$33,899,166 *

The net income for the fiscal year ending in September, 1853, was \$2,608,754. The capital stock and debt were such that current earnings showed a return of about 7.7 per cent on the total.

The capital resources of the nation were growing! Here was one company with over thirty million dollars of debt and capital. Only a little more than sixty years before, Hamilton was struggling to convince a skeptical public that the whole nation could assume the then staggering debt of seventy million dollars.

During the forties and fifties railroad building went on apace. Americans took to railroads as they did to the great open spaces. In fact the two became inseparable. Whoever thought of the West thought in terms of this new form of transportation. Unfortunately our national enthusiasm carries us on to excess. Many roads were constructed through territory that for years to come did not have sufficient population to support the investment. This was especially true in the West and South. When private capital would shun these lean and unpromising territories, the states would sometimes step in to lend credit or subscribe to stock. The frenzy worked up to a peak and was a principal cause of the panic of 1857.

Nevertheless the accomplishments of this period are striking. Prior to 1825 there was no effective commercial artery from the east coast to the Midwest. Then came the Erie Canal. In 1828 we began our first railroads. By 1860 we had the skeleton of a national railroad system as far west as the Mississippi. The Baltimore & Ohio had pushed through to the Ohio River. The New York Central and New York and Erie gave the citizens of the Empire State easy access to the Great Lakes. New England and the middle Atlantic states had tied their large cities together with steel rails. In the South railroads pushed inland from Charleston, Mobile, New Orleans, and Richmond. By making frequent changes and occasionally resorting to water transportation, the traveler could go by rail from New York to Chicago or St. Louis. With much greater ease one could travel from Maine to Washington and Richmond. In this short stretch of thirty years, starting with horse-drawn cars, we had come by 1860 to lead the world in railroad transportation. We had a total of over 30,000 miles of

track and an investment of about eight hundred million dollars. We had completed our primary training in the science of railroad operations. From the manufacturing centers on the east coast to the Mississippi in the West, we had the means for transporting passengers and freight quickly and at reasonable cost. The basis for an enormous economic growth had been laid. The country was now ready to do business on a national scale.

XIV.

THE PACE GROWS FASTER

Express and Telegraph

As new industries are established, they in turn generate others. An excellent illustration of this lies in the record of our first railroads and the occasion they provided for the formation of express companies. Carrying small packages for reliable and prompt delivery was not new. Down through the ages, travelers, post-riders, and stagecoach attendants have performed such services. When we began building the first little railroad lines, it was quite natural for the stagecoach driver, now turned conductor, to continue the practice. However the railroad so advanced the facility of communication that specialization in this other activity became indicated.

One of the first companies to offer such service was Earle's Express, which B. D. and L. B. Earle operated over the new Boston and Providence Railroad, a few years after its founding in 1834.¹ Their business was subsequently extended to include more short rail lines in New England. Messengers and conductors were performing similar services on other railroads. On the Boston & Worcester there happened to be one conductor in particular whose subsequent activities in this field earned him more than ordinary distinction. He has frequently been referred to as the founder of the express business. This was William F. Harnden of Boston.

Early in 1839, as a public service, Harnden offered to carry small packages, drafts, and important papers between New York and Boston. He was apparently the first to do this for such an extended distance. Starting with only a hand valise he found the going pretty difficult at the outset. Competition came from almost every traveler who would undertake commissions to accommodate friends. Gradually the idea of an organized public service took hold and Harnden had enough business to justify the use of special crates of his own and finally special cars. As the business

grew, Harnden was able to make favorable contracts with the railroads and extend his operations to include Albany and Philadelphia. By 1840 he and his associates had opened a transatlantic business. They also handled remittances and cared for immigrants.

Meanwhile, other promoters had started smaller express projects. Shippers, however, were not long to be satisfied with local services offered by a multitude of little companies. The need grew for reliable, well-organized, comprehensive facilities. This provided opportunity for consolidation. In consequence, the two great leaders and competitors of later years were organized about this time—the early 1850's. The American Express Company specially covered northern New England, upper New York State, and the Great Lakes country. The Adams Express Company, capitalized at \$1,200,000, was strong in southern New England and the Ohio Valley. In the meantime the California gold rush had attracted the attention of these companies to the ballooning business on the Pacific Coast. Members of the Adams Express Company formed Adams and Company of California and a few years later the American Express interests organized Wells, Fargo and Company. Hence, within fifteen years after Harnden had made his first trip carrying all of his consignments in a little hand satchel, the express business had grown to continental proportions.

This development marked another important advance in our system of communications. The time required for transmitting papers or money and transporting goods was reduced. Once again it had been made easier for men to carry on trade. Some of the companies even did a postal business, often with the cooperation and approval of local post offices. In forwarding and delivering letters, such concerns issued their own postage stamps. They took pride in the fact that at times their mail service was quicker than that of the regular post office.

It was, however, in the Far West that these express companies made their most spectacular contribution. There, in the days of lusty pioneer growth, in conjunction with stage lines, the pony express and new railroads, they were a vital part of every community. They carried news, medicine, food, letters, money, gold, and practically all of the necessities of living. Although the business was new and growing rapidly, it was handled with a high degree of reliability. Even California wives reached the domiciles of their mates in remote outposts via Wells Fargo or Adams Express. As one commentator has expressed it: "The first three establishments set up in a new mining town were a restaurant, a billiard saloon and a Wells Fargo office." ²

While the express business marked a real advance in communication, it

was soon dwarfed by another achievement. Having already applied the power of expanding steam to the quick movement of men and goods, we were next to avail ourselves of a source of power completely new in its application and signalling the dawn of another era. The tiny electron was put to work to enable men to communicate almost instantaneously over great distances. After a long period of personal sacrifice and exhaustive experiment, Samuel F. B. Morse in 1838 demonstrated under official auspices the practicability of transmitting messages by the electric telegraph. Like most inventions, this one was the product of an evolution in thought and the occupation of many minds. To Morse, however, must go the lion's share of the credit for bringing the telegraph to practical fruition.

Assisting Morse in the development of the invention were Judge Stephen Vail, owner of the Speedwell Iron Works at Morristown, N. J., and his son, Alfred Vail. The former provided a little capital to defray expenses and the latter became an active helper in perfecting the apparatus and developing a code of signals. The path of the inventor was nevertheless long and discouraging. In 1839, Morse, having returned from an unsuccessful trip to secure European patents, was particularly low in spirit and bereft of funds. To keep body and soul together he taught drawing and painting. It was thin going and report has it that to a student, who inquired if a \$10 payment would be of any use, Morse replied: "It would save my life, that's all."

In spite of heart-rending discouragements, Morse kept driving away at Congress to secure an appropriation to build an experimental telegraph line, but it was not until 1843 that the bill providing an appropriation of \$30,000 was finally passed by Congress. Morse, gaunt and threadbare, haunted the Capitol galleries as the bill hung in the balance during the closing days and hours of that session. At the eleventh hour this indomitable spirit was granted his reprieve. Morse was now free to construct a telegraph line between Baltimore and Washington.

For a while the undertaking proceeded promisingly. Then, after almost all of the appropriation had been spent, disaster struck with a vengeance. Morse discovered that his plan for laying the telegraph wires in a lead pipe underground was a failure. Due to faulty insulation, leakage of current occurred. What was to be done? One of Morse's assistants, Ezra Cornell, proposed a solution. This was to abandon the underground cable method entirely and string the wires overhead on poles, using glass insulators at the supporting points. It worked moderately well and the line was successfully completed, first to Annapolis Junction and then to Baltimore. Finally everything was ready for the official trial of the completed line. Morse had arranged that the ceremony should be held in the Supreme

Court room at the Capitol. Here on May 24, 1844, surrounded by a small group of government officials and members of Congress, Morse tapped out the message formally opening the country's first telegraph line. The curtain was going up on that great sequence of miracles in transmitting messages and speech which has so definitely distinguished the modern era from its predecessors. That mysterious phenomenon with which Benjamin Franklin had been so intrigued was making its first bow in applied science. Nothing could have been more appropriate than the words of the first message: "What hath God wrought."

Although the workability of the telegraph had been demonstrated, the road to broad application and commercial success proved to be far from smooth. Morse first offered to sell the government a license to operate under his patents. After serious consideration, the offer was refused on the ground that there was no reasonable prospect that a telegraph line could be made to pay.

Morse and his associates then turned to private sources of capital. Two of his associates, Ezra Cornell and O. S. Wood, opened a small office in New York City for the purpose of interesting men of wealth in building telegraph lines. Morse instruments were exhibited for an admission fee of 25¢. The results were discouraging. Cornell and Wood lived a lean existence. The future founder of Cornell University was subsequently to tell of the thrill he experienced when during this adventure he found a shilling on Broadway and thus could afford a substantial breakfast.

In spite of their many disappointments, these pioneers kept incessantly at work and finally succeeded in raising \$15,000 for the purpose of building a telegraph line from Philadelphia to New York. This was the first of such concerns and was called the Magnetic Telegraph Company. One half of its stock went to the Morse people and one half was allocated to capital. When completed in 1846 the line was only moderately successful. Technical difficulties constantly bedeviled the management. Gradually one problem after another was solved and a small but growing business established. From 1848 onward the Magnetic Telegraph Company had attained sufficient success to pay dividends varying from 2 to 13 per cent a year.

In the meantime other inventors had not been idle. Competing apparatus began to appear and cause concern among Morse's followers. The principal one of these was the so-called "printing telegraph" invented by Royal E. House. It worked well and there were some who believed it might eventually supplant even the Morse instruments.

For the purpose of promoting widespread adoption of his system, Morse granted licenses for restricted territories to different groups which would

undertake to finance, install, and operate a new telegraph line. As his business agent to supervise all this, Morse chose Amos Kendall who had previously been Postmaster General. In pursuing his work, Kendall took a step which was to have important consequences.

During his term of public office, he had been impressed with the initiative and aggressive qualities of the Postmaster at Rochester, New York, Henry O'Rielly. Accordingly, Kendall granted O'Rielly the right to use Morse apparatus in a vast but ill-defined territory running from Philadelphia westward to the Mississippi. In this area and occasionally outside of it, O'Rielly acted as the Great Awakener. He coursed from city to city proclaiming the dawn of a new era for those communities which would finance a telegraph line. Bending his efforts first toward the construction of a line from Philadelphia to Harrisburg, O'Rielly then passed on to Pittsburgh, Cincinnati, St. Louis, New Orleans, and Chicago. Cities such as Rock Island, Quincy, Dubuque, Fort Wayne, Toledo, Piqua, Nashville, Baton Rouge, and many others secured their first telegraph lines through his efforts.

Nor was O'Rielly's path smooth and untroubled. Early in the game he incurred the enmity of F. O. J. Smith, also a promoter of Morse Companies, and the two became leaders of hostile factions, especially in the race to connect Chicago with eastern telegraph lines. Because of the bitter feelings which grew between the two groups, the situation finally became so critical that Kendall, usually a peacemaker, was forced to repudiate O'Rielly's basic contract. O'Rielly went ahead regardless. He built new lines all over the Midwest. These were of the flimsiest construction, running across lots and back country, anything to put the lines through in the shortest space of time. Local farmers supplied the telegraph poles, which frequently were mere saplings, purchased at 10¢ apiece. When O'Rielly came to a broad river such as the Ohio, rowboat service was installed to carry messages between line terminals on opposite shores. No obstacle could deter this impetuous Irishman. Poverty-stricken most of the time, and harassed by many law suits, his flaming enthusiasm carried him forward. Within a few years he had promoted or built over 8000 miles of telegraph lines and had brought Morse's miracle to the service of scores of communities.

But O'Rielly's contribution was not limited to the West and South. Even in his home town of Rochester, N. Y., his enthusiasm was so convincing that as a prophet he secured a following. Among them were some who were to play a dominant role in the building of this new field of communications. Judge Samuel L. Selden, Isaac R. Elwood, and especially Hiram Sibley shortly became leaders in the telegraph business. So impor-

tant were the contributions of these and others that Rochester might well have been called the "telegraph city."

Meanwhile, due to the activities of men like Smith and O'Rielly, the country had broken out in a rash of telegraph company promoting and line construction. There were the embattled groups using Morse apparatus and interests employing House and Bain devices, as well as some who blithely infringed on patents of the others without regard. By the early 1850's not only were many communities interconnected by telegraph but in some instances there existed two or three competing lines. Reckless rate battles ensued. The situation had become chaotic with total business divided among innumerable small companies of limited territorial coverage. This condition was due to the fact that the only way of raising capital had been through appeal to the local pride of different communities.

As time passed the situation got worse instead of better. Morse and Kendall became disturbed. They had hoped that as the use of the telegraph was extended, there would develop some unity of ownership and management. Instead of which it looked as though in place of being served by an effective telegraph service the country would have the job mangled by a sprawling aggregation of headstrong small concerns, many inadequately financed, more badly managed. The whole idea of this important advance in communications was becoming discredited because of poor service and the fact that many of these little companies were losing money.

At this stage the genius of Rochester's Hiram Sibley showed itself. When other businessmen were writing off the telegraph as just another unprofitable adventure, Sibley sensed an opportunity in the prevailing chaos. There were obviously too many small companies. Consolidation would reduce the ill effects of competition. A strong, well-managed company could not only reduce costs but render more effective service. Better service would generate more business. The result would be satisfactory profits. To Sibley this was just simple arithmetic.

The vision, however, was not manifest to those from whom he sought capital. Typical of this attitude were the remarks of one of his friends: "If I do invest in it, Sibley, promise me it shall be a secret between us forever. I'll loan you \$5000—that means give it to you, for you'll lose it, of course—but you are never to tell that I was such a fool. I believe in you, Sibley, but I don't believe in this telegraphy." 4

Sibley, however, lost not one whit of his enthusiasm. Opposition only served to strengthen his own convictions. Constantly he kept arguing his cause. Finally he succeeded in raising a bare \$100,000 with which to press forward and put his consolidation formula to practical tests. The

nucleus for the enterprise was the New York and Mississippi Valley Printing Telegraph Company, operating under the House patents, which Sibley, Selden, and Isaac Butts had formed in 1851.

Having leased one of the O'Reilly lines, The Lake Erie Telegraph Company, which ran from Pittsburgh to Cleveland and from Buffalo to Detroit, Sibley proposed merger with competing interests serving that territory—Ezra Cornell's Erie and Michigan Company, licensed under Morse patents. Such proposal was accepted, and there was put together under unified management the right to use both Morse and House equipment in one important territory. On April 4, 1856, the New York State Legislature granted a charter to a company which was to become one of the most notable in American business annals. With a capital stock of \$500,000 Sibley, Cornell, and their associates had formed the Western Union Telegraph Company.

Slowly Sibley's formula began to prove its soundness. Failing to recognize its potentials, many original stockholders hastily sold out in this period of initial success. Western Union nevertheless sailed vigorously onward. Improving credit permitted larger acquisitions. The fine Atlantic and Ohio Company serving Philadelphia and Pittsburgh was purchased. Following this, lines were added connecting Albany and Buffalo as well as Pittsburgh, Cincinnati, and Louisville. In addition, a new field of service was uncovered. Under the direction of J. H. Wade, contracts were concluded with principal railroad companies for installing and operating telegraph lines along their rights-of-way for use in regulating train movements.

The consolidation process was now succeeding even beyond Sibley's most daring dreams. Telegraphic service had been greatly improved. Public acceptance mounted as our people made this new method of communication part of their daily lives. The business was changing from a field characterized by innumerable, wild, and irresponsible promotions, to one of respectability and high profit. Western Union grew apace and looked better each year.

Meanwhile the forceful and aggressive Hiram Sibley had embarked on another great adventure. His mind had taken fire with the idea of building a telegraph line across the Rocky Mountains to California. When Sibley exploded this seeming bombshell to fellow Western Union directors, bewhiskered chins were stroked in nervous apprehension. The company was making plenty of money. Why challenge Fate with such an ambitious thrust into the unknown? But Sibley once again was adamant. Said he: "Gentlemen, if you won't join hands with me in this thing, I'll

go it alone." In the end their doubts were overcome and they scrambled aboard Sibley's new bandwagon.

Government aid was sought. Congress at first showed little interest but finally, in 1860, our representatives succumbed to Sibley's ardor and enthusiasm. In that year a concession was granted to him for building and operating a telegraph line from a point on the Missouri River to San Francisco. A subsidy of \$40,000 per year for ten years was given. Sibley and some of his Western Union associates formed the Pacific Telegraph Company which assumed the concession and its responsibilities. Then some citizens of California, having become telegraph-minded, asked to join the enterprise. In consequence it was arranged that a consolidation of small California telegraph companies known as the Overland Telegraph Company would undertake to build from San Francisco to Salt Lake City. Sibley's Pacific Telegraph would construct a line from Omaha to Salt Lake City. Profits would go 40 per cent to the former and 60 per cent to the latter, until the yearly revenue should exceed \$70,000, when Overland's share would drop to 30 per cent. A premium was offered for the first to finish. Starting at Placerville, California, in May, 1861, and at Fort Kearney in Nebraska, two months later, a dramatic construction race was on which engaged the attention of the whole nation.

The most difficult problem was that of securing poles. Some were hauled distances of over two hundred miles across rough, roadless country. Gradually, however, all troubles were overcome and the constructors found their work proceeding at an unexpected pace. Finally on October 24, 1861, Sibley's Pacific Telegraph reached Salt Lake City to win the race in an exciting finish just two days before the Overland Company came in from the West. It was a fine achievement for both companies. The work had been done in less than four and one-half months, whereas it had originally been estimated that it might take about two years. The country was thrilled at the astonishing performance and to realize that now California had become a more integral part of the nation, through the miracle of Morse's telegraph. It was, moreover, a great personal triumph for Hiram Sibley.

When completed, the line was besieged with business and became very profitable. There were, however, still some problems. It was not long before the Indians discovered that telegraph wire was a very handy thing to have around for tying tepee poles and other domestic uses. They would break a wire, attach an end to a couple of ponies and strip off large segments of the nation's vital thread of communication. Once, when lightning struck the wire while such an operation was in progress, the redskins forthwith decided that the white man's strange contraption was

definitely bad medicine. In spite of Indian trouble, and occasional stoppages because of storms, the transcontinental telegraph was a great success.

Responding to the momentum gained by these achievements, Hiram Sibley's Western Union continued on the high road of expansion through consolidation. Between 1864 and 1868 the Pacific Telegraph and the Overland Company were absorbed. Following the war, in 1866, Western Union acquired two of its foremost competitors, the United States Telegraph Company and the strong American Telegraph Company. In the eleven years following its birth in 1856, Western Union's capital had grown from \$500,000 to \$41,000,000. Its service extended from Maine to California. Liberal dividends had been paid and many investors made wealthy. Small, inefficient companies had given way to concentrated ownership and big business. Service had been greatly improved but, in spite of active competition, questions of monopoly were arising. Nevertheless the nation was proud of the achievements and Western Union was regarded as a triumph of American enterprise and business management.

XV.

PACKET BOATS AND CLIPPER SHIPS

Britain Puts Her Chips on Steam

WHILE canals and railroads were contributing greatly to domestic trade, advances in ocean shipping served to accelerate foreign commerce. In the period from 1820 to 1860 both Great Britain and the United States achieved new triumphs in shipbuilding and ship operation. We led with ships under canvas; John Bull with those under steam.

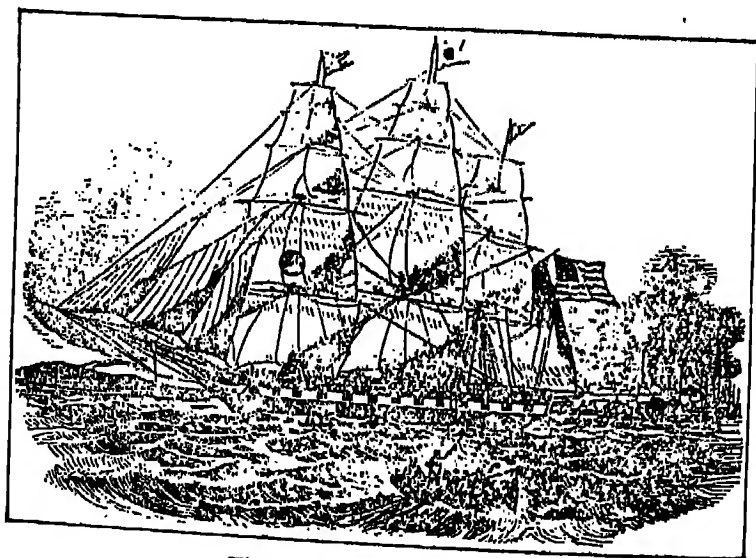
After the War of 1812, the first important advance was our introduction of fast, sail, packet boats. Until these appeared, traffic across the Atlantic had been handled on an easy-going, unorganized basis. Sailings followed indefinite schedules. Ships put out whenever their owners got around to asking for clearance. Nor was there any particular effort to make a quick crossing.

But times were changing. By 1815 our shipowners and operators had sensed the need for a thoroughly organized service of fast, well-equipped smartly handled boats to specialize in high-rate freight, passenger, and mail business. Among the first to enter this field was the Black Ball Line which as early as 1818 inaugurated regular packet schedules between New York and Liverpool. Others followed. Success was as sudden as it was spectacular. Shipping interests and seamen the world over paid homage to this new development.

In appearance the packet boat was much like her predecessors. She was sturdily built, bluff of bow and square of stern. Perhaps she had been laced in a little tighter around the hips to reduce her beam. And she carried sail enough aloft to command the respect of the ablest mariners. One new touch had been added. Passenger accommodations were not only comfortable but even luxurious according to standards of the time.

It was ship handling, however, which really won the packet boats their

fame. Only the best masters were given command. Small but highly experienced crews were employed. The strictest discipline was maintained. Then, once these ships had dropped the pilot and taken a departure, they were *sailed*. It wasn't just good seamanship—it was perfection. Their masters, brought up in our China trade and privateer traditions, drove the packets hard. Canvas was cracked on up to that last point which is often just a hair away from disaster. Night and day these ships were pressed carefully and skillfully to take all the power those North Atlantic gales had to give. Our skippers would be carrying topgallants and royals when



The packet ship *Isaac Webb*

From *The Pageant of America*, copyright Yale University Press

those of other nations would be showing nothing above topsails. It took iron men and iron discipline.

As a result days were saved in crossing the Atlantic. Our packet boats were way out in front. The English were caught flat-footed. For years we had the cream of freight and passenger business. The service and equipment were such that travelers took pride in going across by American packet. "The swiftest of our ocean grey-hounds of to-day awakens no such enthusiasm as the *North America* or the *Columbus* or the *England* of the famous Black Ball Line, did by their sail-passages of eighteen or twenty days from the Hudson to the Mersey, or the *Independence* in her record-breaking run of fourteen days, six hours." 1

Success, however, bred overconfidence. Thus it was that we overlooked the significance of an outstanding feat of American enterprise. Back in 1819, on May 26, the *Savannah* had taken her departure from the port of Savannah for Liverpool. As word of her design and appearance spread among our shipping men, raucous laughter was heard along wharfsides and in wardrooms aboard ship. The *Savannah* bore a factory smoke-stack amidships and was encumbered by ineffective-looking paddle wheels on either side. In a word, she was equipped with auxiliary steam-power—the first vessel of her kind to try the Atlantic crossing. She made her first trip in 25 days, but employed power for only three of them.

While steamboats had by this time been used to some extent on our inland waterways, our deep-sea sailormen were convinced that power presented no challenge to the supremacy of spars and canvas. We had become quite cocky. On the other hand the British, who traditionally take up new ideas with a somewhat measured pace, were much more alert to the possibilities of this new development.

In 1838 the English steam-powered vessel *Great Western* made her famous trip from Bristol to New York in the remarkable time of 15 days and 10 hours. The next year Samuel Cunard was awarded a mail contract and subsidy by the British government. His first ship, the *Britannia*, completed her maiden voyage to Boston in 1840. The first runs of these Cunarders were to Halifax and Boston. Later they were extended to the port of New York. From the outset Cunard's operations were supported by liberal subsidies. This was the beginning of a consistent policy of Parliament to foster this new form of transportation. It was to pay big dividends.

Cunard's steam-powered vessels soon began to cut into our packet shipping. The steamers were making a single crossing in the Liverpool-New York circuit in from fourteen to seventeen days. The packets were doing it in from eighteen to twenty. Most sailing vessels, however, were still taking upwards of twenty-four days. The favorable impact upon shipping and foreign trade of such a saving in time was considerable. Trade was accelerated. A merchant could conclude more transactions within a given period and thus earn more on his capital.

After several years of watching the development of subsidized British steamship lines, Congress belatedly took action. In 1845 an Act was passed authorizing the granting of mail contracts. Although the amounts of our subsidies were smaller, they provided sufficient assistance to enable American interests to compete. Promptly our Ocean Steamship Line started a service between New York, Le Havre, and Bremen.

Among those of our shipping men who saw that new developments of large import were in the making was Edward K. Collins. He had been

head of the famous Dramatic Line of sail packets. Thus seasoned in shipping experience, he was also distinguished for qualities of daring, intelligence, and dynamic energy. In pitting Collins against Cunard, America needed to make no apologies.

In 1847 the government gave Collins and his associates a mail contract between New York and Liverpool. It was stipulated that the steamers should be of at least 2000 gross tons and that through eight months of the year there should be two sailings a month and one sailing in each of the other four. A subsidy of \$385,000 a year was granted to continue for ten years to offset partially the support which England was giving the Cunard Lines.

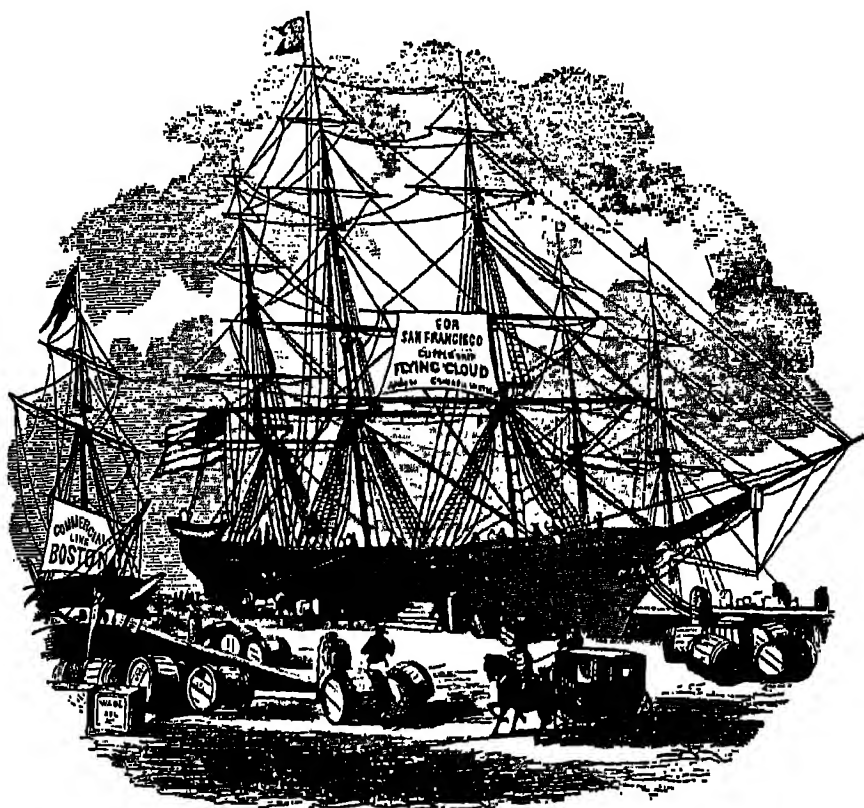
Collins' particular ability was manifest from the very start. Instead of simply meeting the government's requirements as to size which would have put his boats on a par with Cunard's, Collins dared bigger things. He called in George Steers, one of America's leading naval architects. Steers later gained fame as the designer of the great schooner yacht *America* which in 1851 captured the International Cup in a race around the Isle of Wight. Collins, Steers, and two of New York's leading ship-building firms, William H. Brown and Brown & Bell, proceeded to make marine history. They produced the *Arctic*, the *Atlantic*, the *Pacific*, and the *Baltic*.

In design these ships were modeled after the famous packet boats which had proved so successful. They were upwards of 2,700 tons, thus bettering the government requirement as to size by about 35 percent. Rigged with three masts and square sails, they were powered with 800-horsepower steam engines driving the usual side paddle-wheels. For an average twenty-four hour period these ships could turn up about 316 miles.

Again in the One Hundred Years' War for commercial naval supremacy, America was once more in the lead. Cunard's boats were outclassed both as to size and speed. Collins' liners saved about a day and a half in crossing. We had more than overcome the advantage England had secured in the early adoption of steam power for fast freight service between Liverpool and New York. Freight rates fell from £7 10s. to £4 per ton. With Collins as their leader, American boat builders and operators had repeated with steam their former triumphs with sail.

There was another factor which contributed to advance our first efforts in the use of steam for ocean shipping. This was the California gold rush. El Dorado of Sutter's Fort called so strongly to fortune seekers in the east that thousands lined the wharfs in New York seeking transportation. This demand was manna from Heaven for two lines which had opened up service via Panama instead of by the perilous time-consuming route

around the Horn. George Law and associates had a mail contract from New York to the Isthmus, while W. H. Aspinwall operated up the west coast from Panama to the Golden Gate. It was a seller's market. Gold



The famous clipper ship *Flying Cloud*, loading at New York for trip around the Horn to California

Gleason's Pictorial Drawing Room Companion

seekers were willing to pay almost any price for passage and for freight. Accordingly some large fine ships were built. Within a decade nearly thirty vessels aggregating approximately 38,000 tons were pressed into this service. A railroad was constructed through the Panama jungles. Finally the two shipping interests, Law and Aspinwall, combined to form the Pacific Mail Company. In an active, hectic ten-year period when the gold fever registered its highest temperature the Pacific Mail Company carried around 175,000 persons to California. Returning vessels brought out over \$200 million in gold.²

The future seemed promising indeed for American shipping in the early 1850's. Our deep-sea steam tonnage almost equaled that of England. In handling both sail and steam vessels we had no superiors. We were looking forward to having within a few years a larger commercial fleet than the might of Great Britain could muster.

Suddenly untoward things began to happen. Stark tragedy overtook the hero of our new victories in Atlantic steamship operation. Collins lost both the *Arctic* and another of his best ships, the *Pacific*. The former was rammed in a fog and sank, taking with her, among others, Collins' wife and children. An ironical fate for one who had done so much to improve ships and provide more efficient operation. The *Pacific* mysteriously disappeared at sea.

In spite of these losses Collins had the spirit to dream new dreams and the capacity to bring his dreams to life. He pushed ahead and built a marvelous new steamship, almost fifty per cent larger than the ill-starred *Arctic*. This was the *Adriatic*, 345 feet long and of 4144 tons.

Misfortune struck again. Congress began to weaken on the subsidies. In 1855 President Pierce vetoed a bill to extend the extra subsidy which had been granted to Collins in 1852. Then in 1858 the United States canceled its mail contracts. Unfortunately for the future of our maritime power, the subsidy for steam vessels on the Atlantic had become involved in the great sectional conflict which was brewing between the North and the South.

Nevertheless Collins kept on. He was determined to win in spite of the advantageous subsidy which Cunard enjoyed. But the shipping business is run on narrow margins. The handicap proved too great. Unable longer to continue the unequal struggle, he lost his ships under mortgage foreclosure. The pride of the Collins' fleet, the great *Adriatic*, went over to British registry. The long tradition of American ascendancy at sea was broken. We began to lose place in modern ocean transportation.

While this battle of steam operation was being waged on the Atlantic the Yankees, ever a resourceful breed, were forging ahead in another area. Competition from the upstart steam vessels forced our sailing interests to evolve that most famous of all sailing craft—the clipper ship. They saw that quicker time would have to be made if sail were to maintain its place. Accordingly a new hull pattern was worked out with almost revolutionary results. In modern times one would describe the clipper as a streamlined version of preceding sailing ships. The bow was made sharp and narrow. Long flowing lines led from bow to the point of greatest width amidships. The hull was considerably lengthened in relation to the beam. These changes resulted in a graceful, long, narrow body which for a given sail

area would yield much faster time through the water. The clipper marked not only an advance in ship design, it was a thing of great beauty as well. But there are always skeptics. Some who inspected the first true clipper, the *Rainbow*, designed by John W. Griffiths and built at New York in 1845, saw only folly in this new departure. They predicted, with knowing argument, that in a head or following sea the ship would bury her nose under and never come up. Ridicule turned to praise when the *Rainbow* completed the trip from Canton to New York with a saving of about three weeks.

The clippers were used largely on the comparatively longer voyages although some saw service in the Atlantic. Their increased speed enabled them to make the New York-San Francisco run via Cape Horn on the average 30 per cent faster than ships of the old-fashioned design. One of the fastest, the *Comet*, went from the Golden Gate to Sandy Hook in 83 days, logging an average of 210 miles a day. *Sovereign of the Seas*, built by Donald McKay, made 340 miles in a record twenty-four hour run. "Indeed, in anything like a fair, strong breeze, these long, finely modelled clipper ships could overtake a lumbering steamship, pass her, and run her hull down in a few hours." *

With this confirmation of the success of the new clippers and under the pressure for more transportation to California, American shipbuilders enjoyed a great burst of prosperity. Our shipyards, especially those along the East River in New York, were soon turning out a new commercial fleet. In 1855 some 2027 vessels were built, totalling 583,450 tons. Not only did we supply our own demand but in the four years from 1854 to 1858 we sold over five million dollars worth of ships to foreign interests.

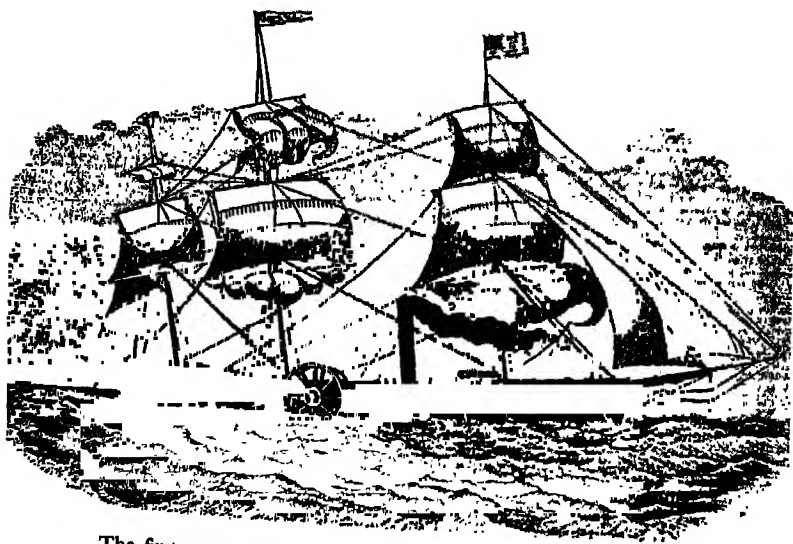
Unfortunately the brilliance of these accomplishments blinded us to the greater potentialities of steam navigation. We imagined that with the clippers maritime efficiency had attained the ultimate; that steam propulsion was a thing of limited future restricted to the comparatively short trips between American and European ports. Not so with the British. They persistently drove ahead to improve their sooty, plodding steamships. They expanded the use of iron-hull construction and first adopted double bottoms and watertight bulkheads.

Meanwhile the pattern of our overseas commerce was changing. Trade with the British West Indies decreased in importance. That with England and northern Europe grew rapidly and in the years between 1850 and 1860 accounted for 75 per cent of our exports and provided us with around 66 per cent of our imports. England was by far our best customer and the source of most of our overseas purchases.

The result of these various factors was that while our shipping and for-

ign trade grew expansively in absolute amounts, it lost ground relatively. Between 1825 and 1860 American shipping in foreign trade went from 665,000 tons to over 2,300,000 tons and total overseas commerce increased from around \$180 million to about \$687 million. Meanwhile the percentage carried in our own ships dropped from over 90 to 66.5.*

During this period, the most important commodity in our foreign trade was cotton. Before 1820 we had never exported as much as one hundred million pounds a year. In 1860 we shipped 1700 million pounds at a value nearly equal to two-thirds of all our exports. Shipments of pork, wheat,



The first ocean steamship, the American steamer "Savannah"
Gleason's Pictorial Drawing Room Companion, 1854

and flour were also large. Agricultural products accounted for 80 per cent of our total exports. Imports consisted largely of wool, silk and cotton textiles, iron, steel, and cutlery. New Orleans was the leading port for exports and did more of this business than New York, Boston, Philadelphia, and Baltimore combined. On the other hand, New York handled two-thirds of the import business of the nation.

One reason for our losing ground in our relative position in overseas commerce was the fact that domestic trade had assumed new importance. Our merchants and manufacturers had their hopes fixed on the opening of the West. This internal trade of ours was not only expanding westward but was growing sturdily in every direction. For example, coastwise busi-

ness along the Atlantic seaboard and Gulf coast was making use of about the same ship tonnage as our deep-sea trade. Because of the shorter distances between ports, coastal ships handled many times as much business as those in foreign commerce. This coastwise trade consisted largely of cotton, sugar, rice, and naval stores moving North, balanced by cloth, tools, hardware, and flour moving South.

Commerce and shipping were not the only salt-water activities in which our people prospered. Our most dramatic achievements were in whaling. We recall that the impressment of American seamen and the hazards of war had almost driven our whalers out of business in 1814. Following the Treaty of Ghent, the English Navy ceased to prey on our mariners and our whaling industry resumed its growth. From 1820 to 1858 ships from Nantucket, New Bedford, Fairhaven, and Sag Harbor brought in a rising volume of whale oil and bone. The tonnage of ships in this business increased from 36,445 in 1820 to 198,594 in 1858. "In 1842, out of the world's total whaling fleet of 882 sail, 652 were American vessels." ⁶

This was the glorious epoch in American whaling. Those skillful tough-fibered mariners from our diminutive Atlantic ports pushed their little square riggers into longer and longer cruises. There were no areas so remote or so dangerous as to deny them entrance. The South Seas were alive with Yankee whalers. The giant mammals—swimming tanks of oil—were hunted almost literally from Pole to Pole. Wherever whales disported themselves that part of the globe became a bit of New England. "In 1848 Captain Royce, in the bark *Superior* of Sag Harbor, steered through Bering's Strait and attacked the great bowhead whales of the Arctic," ⁶ Within three years, 250 Yankee ships had returned from whaling voyages in Arctic waters. Our supremacy in this tough work was unchallenged.

Stirring as were these accomplishments, the business of whaling was not destined to last long. The peak was reached in the forties and fifties. Then misfortune struck from two directions. The whale had been hunted, not quite into extermination but definitely into extreme scarcity. Next came the use of petroleum for illumination and the bringing in of the first drilled oil well by Drake in 1859. This was the death knell. It spelled the finish for this gallant little industry which down through the years had blazed to the world the courage, skill, and resourcefulness of American seamen.

XVI.

BETTER TOOLS YIELD GROWING ABUNDANCE

The Sewing Machine and the Reaper

RESERVES of capital built up patiently over long years in foreign commerce were now to be magically multiplied within one generation. Fostered by an array of fortunate circumstances, our first large factory industry was established. Centered in New England, the manufacture of cotton cloth quickly attained a dominant position in our economy. Taking advantage of the achievements in applied science of Slater, Whitney, and Lowell, New England capital turned with alacrity from the vicissitudes of foreign trade to this richly promising field of domestic enterprise.

Although in the early years our mills concentrated on the coarser fabrics, by the 1820's we were turning out fine calicoes and printed cloth of such quality as to compete successfully with imported fabrics. Our new textile companies soon dominated the domestic market. The growth of the industry was truly astounding. In the twelve years following 1820 the mills of Rhode Island expanded from 70,000 to 240,000 spindles and those of Massachusetts from 52,000 to 340,000. Boston became the financial capital of the industry and Lowell the chief manufacturing center. In 1831 we had upwards of forty million dollars invested in mills, which operated about 1,240,000 spindles to produce over 230 million yards of cotton cloth.¹ These mills took about 20 per cent of the cotton crop which after conversion into cloth had a value about equal to the remaining 80 per cent which was exported.

The establishment of these early textile mills presented a new and difficult problem to the businessmen who managed them. This was the matter of securing workers. As these were our first factories, there were no concentrations of labor upon which to draw. We had no laboring class. There were, of course, many artisans and craftsmen but they were scattered in

small shops from Maine to the Mississippi and commanded relatively high wages. The problem was solved by recruiting factory operatives from near-by agricultural areas, a practice which in some places has continued even down to the present. Luckily for these early mills, the response was a ready one. An important migration began as men and women left New England farms to take up life in the new mill towns. Women operatives outnumbered men. It has rarely been difficult to persuade daughters of Eve that life on a farm leaves something to be desired. By the year 1831 some 800 textile mills were employing upwards of 38,000 women, 18,000 men, and 4,000 children.

In bringing these operatives to a mill site it was usually necessary for the company to provide dwellings and frequently board as well. Hence there grew up a high degree of paternalism. Company officials felt themselves responsible for their mill hands not only during working hours but in off-time periods as well. At the outset the quality of personnel was high. The girls lived in comfortable quarters and earned enough, if they were careful, to send remittances back to the farm. Travelers commented favorably on the contrast with the older English mill towns.

The relationships between one of these textile companies and its employees is indicated by the following quotation from its regulations:

Article 1:

All persons employed by the Company must devote themselves assiduously to their work during working hours. . . . They must on all occasions, both in their words and in their actions, show that they are penetrated by a laudable love of temperance and virtue, and animated by a sense of their moral and social obligations. The Agent of the Company shall endeavor to set to all a good example in this respect. Every individual who shall be notoriously dissolute, idle, dishonest, or intemperate, who shall be in the practice of absenting himself from divine service, or shall violate the Sabbath, or shall be addicted to gaming, shall be dismissed from the service of the Company.²

The success of these textile mills caused an important advance in our standard of living. Cotton cloth was made available for a wide range of clothing and household uses. The application broadened as the cost of labor declined. Public acceptance of cotton fabrics was so avid that by 1860 the industry with approximately 5 million spindles was fabricating cloth valued at over \$115 million.

The surge of industrialization had begun. Power would be applied increasingly to the production of goods in factories. Concentration of workers and urbanization would proceed at an accelerating pace. We would develop a laboring class. Gradually the nation would change from an

economy predominantly agricultural to one in which industry played the greater part. From the social and economic consequences of this evolution our people would benefit hugely and at times suffer distressingly. Our standard of living would rise to provide us with more goods and conveniences than those possessed by any other people. With the establishment of this first factory industry, we had embarked upon a new economic adventure of high destiny in which the American genius would make an outstanding contribution.

The application of steam power to manufacturing and more particularly to transportation brought new and increased demands for iron. Previously, during the centuries when the motive power applied to machines and tools was that of man himself or his animals, or even small water wheels, structural parts of machinery were largely made of wood. In the pre-steam era it served admirably. It was moderately strong, easy to work, and universally available. But when we began to harness the power of expanding steam, it became essential that iron with its greater strength and durability should be employed to meet the new requirements. The steam engine, boiler, and fire box called for iron. Similarly, iron was needed in our new factories for loom frames and power-transmission equipment. The construction of railroads involved vast amounts for tracks, spikes, car wheels, trucks, and locomotives. All these factors added up to a total demand for iron in hitherto undreamed of quantities. Had there not occurred at this time a revolutionary development in its production, our progress in transportation and manufacturing might have been slow indeed. Luckily such an event was at hand.

For about ten years after our first little locomotives began tearing across country at the incredible speed of 15 miles per hour, belching smoke and sparks over their enthusiastic passengers, ironmaking was carried on just as it had been for two centuries in small and widely separated plants. Charcoal was the only fuel. Its use placed definite limits upon mass production because the consumption of timber was great and its transportation costly. In 1828, the year in which the Baltimore & Ohio Railroad was started and a year before the first locomotive was built in the United States, we were operating some 190 small furnaces to yield an annual production of only 125,404 tons of pig iron. These little plants were scattered from Vermont to North Carolina and Tennessee. They were usually located at small waterpower sites so that a bellows for an air blast could be operated by a water wheel.

Fortunately, however, in the decade which saw the building of our first railroads important events occurred in the iron industry. In 1828

James B. Neilson in Scotland secured a patent for using a hot-air blast in smelting iron ore instead of the cold air previously employed. Then, in the United States, Dr. Frederick W. Geissenhainer, making use of the hot-air blast, began a series of experiments with anthracite coal as a fuel in place of charcoal. His efforts were crowned with success in 1836 at the Valley Furnace near Pottsville, Pennsylvania. The first commercial application of the new all-anthracite process was made a few years later by Erskine Hazard, George Crane, and David Thomas at their Lehigh Crane Iron Company at Catasauqua, Pennsylvania. Others pursued separate courses to the same end.

Once its practicability was demonstrated, the anthracite process took hold quickly. In 1840 we had 6 such furnaces; in 1846, 42; and in 1856, 121. During these years the use of coke from bituminous coal was also tried. Its application came more slowly but by 1856 there were 21 furnaces in Pennsylvania using it as fuel.

This passage from the age-old process of smelting with charcoal was a great forward step in our industrial development. It gave to American industry a broad base for expanding operations at a time when applied science was ready to advance over a wide front. Our iron production increased from 285,000 tons in 1840 to about one million tons in 1860.

Most urgent were the needs of our new railroads. The thought of importing tons of English rails each year was not long to be endured. In 1844 we began to produce rails in our own rolling mills. By 1849, sixteen rail mills were producing more than 100,000 tons per year, a great advance over our condition in the early 1830's when we were unable to provide the meager 15,000 tons of strap iron for rails needed by the Baltimore & Ohio Railroad.

Stemming directly from railroad operation was locomotive building. Among the first to take up this work was Matthias W. Baldwin in the early 1830's. The story of the Baldwin Locomotive Works is a graphic illustration of the way in which new businesses are born. Baldwin had been successively a manufacturer of jewelry, then of bookbinders' tools, and later a maker of printing rolls for calico printing. Becoming interested in steam, the new power which had inflamed the imaginations of so many mechanics of that period, he decided to find out about steam engines. In his own work shop he built a six horse-power stationary steam engine which performed successfully. Next, he manufactured and sold small stationary engines to local factories converting to the new source of power.

Then in 1830 word got around that the Camden and Amboy Railway had secured one of the English locomotives about which there was so much public speculation. This machine was jealously guarded by the rail-

road management in a storehouse near Philadelphia, a fact which only served to whet Matt Baldwin's competitive instinct. Accompanied by his friend Franklin Peale, at that time proprietor of the Philadelphia Museum, Baldwin prevailed upon those guarding the new locomotive to permit him to inspect it. After a short examination Baldwin concluded that he could duplicate the English model and proceeded to construct a miniature locomotive. This model was operated on a short stretch of track in the arcade of the Philadelphia Museum and was used to pull spectators around in two diminutive cars with a capacity of two passengers each.

Fortified by his experience with his small model, Baldwin built in 1832 his first commercial locomotive, named *Ironsides*, which he sold to the Philadelphia and Germantown Railroad. This engine was placed in operation during January, 1833, and its use was advertised in Poulson's *American Advertiser* as follows:

Notice. The Locomotive Engine, built by M. W. Baldwin of this city, will depart daily, when the weather is fair, with a train of passenger cars. On rainy days, horses will be attached."

It is a far cry from Matt Baldwin's six-ton locomotive, which on rainy days conceded the superiority of the horse, to the 200-ton monster of today traveling at 100 miles per hour. Such, however, was the beginning of the Baldwin Locomotive Works. Their accomplishments were soon paralleled by other companies, among them the Norris Works in Philadelphia and the West Point Foundry in New York. Thus the railroad had brought about the development of two new industries for the nation; the rolling of rails, and the building of locomotives and rolling stock.

A noteworthy aspect of the use of iron during these early days was the great part which castings played in the mechanical industries. Steel in its modern industrial application did not appear until after the Civil War. We therefore find the foundrymen of this period struggling to make huge iron castings which by sheer weight and thickness would give the needed strength for steam engines and steam-driven machines. It was natural, then, that the making of steam engines tended to become a local business. Pittsburgh, Cincinnati, and Louisville made steamboats for the Mississippi River system. New York and Philadelphia supplied the coastal and river steamers of the East.

These early ironworkers were forced to pioneer in the development of tools to machine their products. That they proceeded gropingly toward such ends may be seen from a description of a planer that was used to smooth off surfaces on bedplates for presses. This amazing tool consisted of an enormous carpenter's plane that was drawn across the bedplate sur-

faces by a chain and windlass. To keep it weighted down three or four men stood upon it during the planing operation.

Impressive as were our achievements in the production and machining of heavy iron equipment, equally striking were our advances in the art of light metalworking. In this field New England became preeminent. This was not so much a matter of choice as of necessity. When our iron-



Before the days of farm machinery, our ancestors were using the tools and methods employed B.C. along the Nile

The Growth of Industrial Art, Benj. Butterworth, United States Patent Office

makers turned to the use of coal as fuel the Yankee states were ruled out. Nature had provided New England with no coal and only skimpy deposits of iron ore. But those sons of Yankee shipmasters, merchants, and China traders were born to a tradition of survival. If they could not produce iron themselves, they could tool out finished parts. They had already acquired metalworking skill in making shipfittings. A natural development was the manufacture of textile machinery and factory equipment for New England mills since spinning frames, looms, and mill accessories were now being built of iron. This gave New England a running start in the light

machinery field. The advantage was pressed with ingenuity and enthusiasm.

It was soon apparent that these New England mechanics possessed qualities that marked them as belonging to the modern age of manufacture. They constantly worked toward the automatic, quantity production of small metal parts. Any time-honored hand operation was a challenge they could not resist. We outdistanced our English rivals in many ways as these Yankee workmen perfected automatic machinery for making carding teeth, nails, screws, bolts, spikes, files, chains, and clock parts.

Wiredrawing was another conquest. While this process was not new to our workmen, it remained merely a craft until Ichabod Washburn and Benjamin Goddard developed improved equipment and in 1832 began quantity production at Northville, Massachusetts. Their success was such that within a few years their wire had completely supplanted that from England, which until then had constituted our principal supply. This accomplishment was opportune, occurring as it did about the time that we began stringing telegraph lines over our great open spaces. Largely through their achievements, American wiredrawing machinery was acclaimed as the world's best. This industry soon assumed an important status in New England economy.

It was also during these years that American inventive genius gave to the world one of the greatest labor-saving devices of all time—the sewing machine. As early as 1836 Walter Hunt of New York had conceived the idea that was basic for subsequent successful sewing machines. This was the combined use of an eye-pointed needle and an under-thread shuttle to produce the lockstitch. He neglected to patent it, however, and later, in 1846, Elias Howe of Spencer, Massachusetts, working independently, took out a patent for a machine embodying the same functional operations. Other inventors contributed improvements and the sewing machine suddenly became a practical success. In 1851 Isaac M. Singer in New York started his business, which in subsequent years dominated the industry. Public acceptance of this new device was enthusiastic and it was not long before domestic and foreign sales assumed large proportions. By 1860 our plants in New York and New England were producing over 100,000 sewing machines each year.

These Yankee businessmen were not only resourceful in invention and skillful in production but they also knew a thing or two about selling. They were go-getters of the most aggressive type. Emerson's dictum about better mousetraps might be good philosophy but it made no allowance for a competitor who was so wanting in the finer instincts that he refused to wait for customers and brashly went out to solicit orders on their door-

steps. The old spirit which in former years had driven New Englanders to sell pipe staves in Portugal and furs in China was still very much alive.

A picturesque instance of these vigorous selling methods existed in the Yankee tinware-wagon peddler. These itinerant merchants were a national institution and as familiar to our grandparents as chain stores are to us

SINGER'S

PATENT STRAIGHT NEEDLE



PERPENDICULAR ACTION

Sewing Machine,

Patented August 12th, 1851.—A second patent for great improvements issued April 13th, 1852.

This is the most valuable Invention now before the Public. Since the introduction of the steam engine, human ingenuity has devised nothing which is so complete and efficient in its operation, and of such extensive application to the necessary business of life. Its reputation is established.

I. M. Singer & Co.

One of America's significant early developments in labor-saving devices was the sewing machine

Courtesy of the Singer Manufacturing Co.

today. During the colonial era, some Connecticut merchants engaged in overland trade with the Dutch in New York and the French in Canada. At first these peddlers simply carried on their backs small packs of curiously assorted merchandise. As trails developed into primitive roads, wagons were used to transport cheese, codfish, clothing, and all kinds of wooden household utensils over tenuous lines of commerce. When in the period from 1830 to 1860 small Connecticut metal shops began to turn

out tin utensils, there already existed the nucleus of a distribution system. The immediate popularity of these tin utensils led salesmen constantly to explore new markets. Tinware peddlers developed routes from the Canadian border to the Gulf and from Long Island Sound to the Mississippi River. Rare was the household they did not canvass. The Census of 1860 showed 17,000 of these traveling salesmen. This was our first retail selling on a national scale. It put those little Yankee work-shops of New England in touch with almost every home in America.

Yet this was but a transitional stage. The tinware peddler offered only occasional, irregular service to his customers. The process was slow and ill-adapted to a large movement of goods. As demand grew and railroads reached a greater number of communities, it was obviously cheaper to move goods in quantity by rail for at least part of the distance and then to split consignments for local distribution. The tinware peddler put up his horse and wagon to settle in some favorable community as a cross-roads merchant. His merchandise was secured from wholesalers. He lost his contact with the factory but he offered his customers all-year-round service with a more complete line of goods.

While businessmen of the East were pushing ahead in many directions, those in the West embarked upon adventures no less significant. In the later years of this period (1820-1860) they achieved a great advance in applied science—the production of modern agricultural machinery. This development was of the essence of the new West.

Settlers in our prairie states soon realized that the conditions they faced called for methods quite different from those pursued on the small farms of the East and of Europe. Here vast level areas stretched for endless distances. The soil was remarkably fertile. Products in quantity could be moved at low cost to tidewater via the Great Lakes, the Erie Canal, and the new railroads. Measured against these potentials, labor was scarce. This was a stimulating situation to encounter at a time when men in other fields were meeting with such success in applying mechanical principles to multiply the output of hand labor. Men like Cyrus McCormick, John Deere, William Deering, James Oliver, and later John Appleby, answered this challenge with their new steel plows, reapers, binders, harvesters, and cultivators. They invented new equipment and improved the old. They bludgeoned a skeptical world into enthusiastic acceptance of their products. Their backwoods blacksmith shops became small factories and soon grew into large plants. An ever-increasing volume of farm tools and equipment was dispatched to all quarters of the globe.

Cyrus McCormick's career typifies the forceful, grassroots quality of

American business and presents a graphic picture of how big enterprises are developed. In 1831 McCormick, working in a little blacksmith shop in Virginia, put together with the assistance of a colored helper, a horse-drawn reaper for harvesting wheat. This crude, rickety contraption was



Cyrus McCormick demonstrating one of his first reapers
Courtesy of The International Harvester Company

submitted to public trials and proved moderately successful. Instead of pressing its development, Cyrus and his father succumbed to the lure of distant pastures and embarked in the iron business. They built a little charcoal furnace and saw visions of high prosperity. Circumstances, however, showed no sympathy with this struggling project. The panic of 1837 killed the business and wiped out their tangible assets.

Adversity now directed Cyrus into the field which was to permit him to

function in a great way. The only thing left to the family in the aftermath of the panic was the patent on the reaper. Back he went into the cross-roads smithy to fabricate a few crude reapers. These he demonstrated and peddled himself. Cyrus was workman, foreman, salesman, and treasurer all in one. Success came slowly; failures occurred and parts had to be redesigned. Customers were convinced only by rigorous trials. The savings in labor by using the reaper must practically be money in the bank before wary farmers would buy. The price of the machine was \$100.

The fight was uphill but his business grew. McCormick moved his shop to Chicago in 1847. He had concluded that the prairies with their extensive, level acres would offer a better market than the little hillside farms in Virginia. Once located in the heart of the western farming country, the reaper business really got under way. In 1849 the McCormick Company sold 1500 reapers. From then on the business grew vigorously over the years. Thus was founded the enterprise which would in later years become one of the world's best-known business concerns, the International Harvester Company.

Success in this field was not easy. Much more than a new invention was required. Organizing ability and good salesmanship were essential. Most important of all was an instinct for sound business practice.

McCormick possessed these qualities in a high degree. He established a national sales organization on a basis new for those times but today still considered sound practice. This involved appointing general agents for particular territories who were really supervisors over a group of local agents. In turn local agents did the selling through subagents working in almost every sizable farming community. These selling agents operated very much as motor-car dealers do today. They were required to maintain a supply of essential parts. They continually checked equipment and instructed farmers. They sold by demonstration in the field or by competitive trials. They collected payments.

McCormick realized at the outset that extension of credit would be essential to the success of this business. The farmer was in funds only once during the twelve months. With reapers selling for \$125 in the 1850's it was possible to secure only 10 to 25 per cent of the selling price upon delivery. For the balance, credit must be extended over twelve to fourteen months. To give such credit was good business; to have given more would have been unsound.

Extremely competitive conditions in the early days of selling farm machinery bred some dramatic scenes. Any sizable prospective purchase was sure to involve field trials of competing reapers, mowers, plows, or binders. The countryside would turn out to cheer on the respective agents

or exult in their discomfiture. It was not unusual to witness a couple of mower agents driving their machines against heavy poles in order to prove which was the more rugged. Word had it also that one manufacturer maintained a secret crew to go into farm barns at night and break or dismantle vital parts of a competitor's equipment.

It was in this atmosphere of rugged, aggressive competition that the businessmen who made agricultural implements were conditioned. The success story of others was pretty much like McCormick's. John Deere, for example, began manufacturing the new steel-faced plow in his blacksmith shop at Grand Detour, Illinois. Within a few years, he, too, had developed business on a national scale.

Not content with this active domestic trade these manufacturers began as early as 1850 to invade foreign markets. Both McCormick and Obed Hussey demonstrated their competing reapers at the Central Palace Exhibition of the Industries of All Nations at London in 1851. McCormick's machine, which the *London Times* described as a "cross between an Astley Chariot, a wheelbarrow and a flying machine,"⁴ won the exhibition's Council Medal, and both he and Hussey immediately established an English market.

American farm machinery attained world-wide recognition. We did business from the steppes of Russia to the back country of Australia. We built factories in many foreign countries. Within another generation our success was such that we had secured control of 80 per cent of the world's business in the manufacture and distribution of farm machinery.

The significance of these achievements is not to be measured solely by the prosperity of this particular industry. Through increasing the productivity of agricultural workers who remained on the farm, it was possible to release others to take up industrial pursuits. Accelerated production of grain for export assisted the North in winning the Civil War. In truth plows and reapers became the weapons of Mars. "It seems like the stroke of an ironical fate which decreed that since it was the invention of a Northerner, Eli Whitney, that made inevitable the Civil War, so it was the invention of a Southerner, Cyrus McCormick, that made inevitable the ending of that war in favor of the North."⁵

But there are even broader implications. The very nature of food is such that a substantial increase in its supply has deep social and political consequences. The wide use of American agricultural machinery has added greatly to the world's productive potentials, lessened costs, and contributed to a higher standard of living. Wherever on the face of this old globe Adam's breed delves, there will be found American farm equipment to multiply the earth's abundance.

XVII.

OLD HICKORY AND THE UNITED STATES BANK

Speculation and Panic of 1837

THE field of finance during the years 1820 to 1860 was one of both adventure and vicissitude. From 1830 on there were few dull moments. Beginning with the battle over the second United States Bank we ran the gamut of financial experiences which had our people disturbed or confused most of the time. A hectic orgy of land speculation abetted by inflationary bank loans led up to the panic of 1837. Then specie payments were suspended as our note-issuing banks endeavored to put their houses in order. Even state governments were caught in over-borrowing for public improvements. There was a running controversy between advocates of a paper-money currency and those who favored only specie. Later a renewed fever of organizing banks took place with a resultant increase of note issues. Then, under the impact of our mistakes, we began to introduce principles of sound finance and organization into our banking system. Finally, we encountered the short-lived depression of 1857. All in all, money, banking, panics, and depressions gave our people some difficult and uncertain years. Nevertheless, the growth of the Republic went vigorously forward.

The most colorful personality of those who took part in these adventures was that fiery old warrior from the West, Andrew Jackson. More than anything else he loved a fight. When he ran out of duelling opponents, Indians and the English, he was reduced to engaging bankers and businessmen for want of foemen worthier of his steel. In this field he created quite a ruckus.

Political power, of course, had gone to the people beyond the Alleghanies. Now this power in the person of Jackson began molding the financial policies of the nation. Following the economic disturbances of 1819-22 and until Jackson took office in 1829 there had been a successful but un-

eventful interlude in the fiscal affairs of government. A steady income from customs receipts and land sales gave the Treasury a regular surplus except for a small deficit in the year 1824. The national debt was pared down. All in all, things were quite serene. It was the calm which precedes the storm. Old Hickory proved to be a one-man hurricane.

With all his fire, color, and passion for the raw democracy of the West, Jackson was at heart something of a conservative. This was shown early in his first administration when he went "agin" the prevailing philosophy of his own people and took a firm stand opposing federal financing of internal improvements of a local character. The air was alive with promotions of this kind. Jackson vetoed a bill which Congress had hurriedly passed providing that the government should subscribe to the stock of the "Maysville, Washington, Paris, and Lexington Turnpike Road Company." Had he given his support to this fever for roads, bridges, and canals, the federal government might have found itself in the same leaky boat as did some of the states when the panic of 1837 struck.

It was not until the election year of 1832 that Jackson really went on the warpath. In the so-called Bank War which then broke out, but which had actually been brewing for some time, he led the forces opposing renewal of the charter of the second Bank of the United States, due to expire in 1836.

This institution, launched in 1816 and patterned after Hamilton's first United States Bank, had, after early vicissitudes, been doing an effective job. With headquarters in Philadelphia it operated some twenty-five branches throughout the country. The bank was the official depository of government funds and through its branches these were made available in different localities as federal needs required. Its notes and drafts, effectively convertible into specie, provided the business community with a stable, uniform currency of wide circulation. Western branches were used to facilitate sales of federal lands. Generally speaking, the second Bank was performing useful functions for both government and business.

The road was not smooth however. As we have already noted, at the time of the panic of 1819 the operation of the Bank raised questions of states' rights and precipitated conflicts with local business interests. When Jackson first assumed the Presidency in 1829, feeling against the Bank had once more been aroused in the West and South. State banks were jealous of the superior circulating quality of the notes of the Bank of the United States. Furthermore they resented the steps which were taken by that institution to force the local banks to redeem their own notes in specie, a requirement which worked greatly to restrict inflated issues of state bank notes.

This antipathy had its roots in an aspect of our frontier settling which recurrently made itself felt from the days of John Winthrop to William Jennings Bryan and Franklin D. Roosevelt. The idea that they needed more money in circulation has dogged our farming people from the era when wampum was used down to the silver coinage fever of the late nineteenth century and the dollar devaluation of the New Deal. To the western settlers, rich in land but short of cash, the state banks with their expansive attitude toward note issues seemed the answer to all their troubles. Conversely the United States Bank was regarded as a meddlesome intruder.

That Jackson should take a stand of hostility toward the United States Bank therefore reflected both his own ideas and the common attitude of his main political strength. However to discern any rational approach to these currency and banking problems on Jackson's part is difficult. His ignorance on such matters was abysmal. It is more than probable that his distrust of the Bank sprang as much from fear of the unknown, or rather nonunderstood, as from anything else.

Nevertheless Old Hickory availed himself of specific charges. He attacked the Bank on the grounds that it was a monopoly operating outside government control and that its continuance was a threat to the liberties of the people. This far-fetched criticism was well received in certain quarters because at the time there was a wide resurgence of the emotional side of Jeffersonian democracy. Concentrated federal power, large financial institutions, and all their manifestations were in disrepute. This attitude we find typified when Amos Kendall proclaimed that the Bank was the principal instrument of a "Nobility System" in the United States.

Another point of attack on the Bank by Jackson and his followers was the territorial nature of its ownership. He pointed out that the people of the West and Southwest owned a bare 5 per cent of the twenty-eight million dollars of its stock. On the other hand, investors in the East owned almost one-half of its capital. High interest rates were charged on loans in the West and Southwest. To Jackson and his western adherents this looked as if the poor pioneer farmers were being exploited by the moneyed interests of the East through the instrument of a federal monopoly.

Nicholas Biddle as President of the Bank led the forces campaigning for its recharter. He had a good cause as the Bank under Biddle's management had been a constructive factor in improving our currency and banking systems. It had the political support of Clay and Webster and was endorsed by substantial business interests of the country. Unfortunately things had been done which weakened the Bank's case and added to the success of Jackson's opposition.

The most serious substantiated charge against the Bank was that it had

made generous use of its funds to secure newspaper support for its activities and especially for recharter. Liberal loans were advanced to important publications, notably one to the publishers of the *Courier and Enquirer* in New York City which later was much criticized. Contracts were freely made with printers for publishing and distributing articles favorable to the continuance of the Bank.

Furthermore the Bank had adopted a somewhat overfriendly attitude toward members of Congress. Advances against future salary payments were made and loans arranged under terms that were particularly easy during the period when recharter was being considered.

Equally disturbing to Jackson was the manner in which Biddle carried on. The latter was very much the czar in the Bank regime and in fact dominated its management. As an individualist he was about as rugged a specimen as Jackson, who regarded with distrust such a position of power outside the dominion of government. Not only that, but Biddle himself was active in directing the lobbying which went on in Washington for recharter of the Bank. Inasmuch as the case for the recharter became involved in politics, Jackson, of course, could only glare with a bilious eye upon these proceedings.

An event which served to augment Jackson's antipathy for the Bank was an incident in 1832 regarding the payment of part of the government debt. The Treasury announced its intention of calling for payment on July 1st of some six and a half million dollars of the government's 3 per cent stock. This meant a draft on the Bank as the government depository. Due to previous debt retirement and heavy commercial use of the Bank's resources, Biddle found it impossible to make the July 1st settlement on that date. He hurried to Washington to ask for time and secured a preliminary arrangement by which payment was postponed.

This affair particularly aroused Jackson's suspicion. He had no understanding of the Bank's problems. He could not see that the Treasury should have conferred with the bank in advance on the program for heavy drafts on government balances. In a flare of temper Old Hickory stormed, "I tell you, sir, she's broke. Mr. Biddle is a proud man and he never would have come to Washington to ask me for a postponement if the bank had had the money. Never, sir. The bank's broke, and Biddle knows it."¹

All these things served to strengthen Jackson's innate distrust of the Bank. When, in July, 1832, Congress passed a bill renewing the Bank's charter, Jackson promptly vetoed it. In explaining his action Jackson pulled out all the political stops about ridding the country of a powerful money monopoly and his desire to safeguard the liberties of the common citizen.

Little was said, however, on the financial and economic questions involved.

In the election of 1832 Jackson overwhelmingly defeated Clay who had espoused continuance of the Bank. To Jackson this appeared as a public mandate. At once he sought means to administer the *coup de grâce* to the Bank, fearing that unless this were done its friends would muster renewed strength in Congress.

Jackson's attitude at this time may be gathered from the following excerpt from a letter he wrote in April of 1833:

This combination [of Clay and Calhoun] wields the U. States Bank, & with its corrupting influence they calculate to carry every thing, even its recharter by two thirds of Congress, against the veto of the Executive, if they can do this, they calculate with certainty to put Clay or Calhoun in the Presidency,—and I have no hesitation to say, if they can recharter the bank, with this hydra of corruption they will rule the nation, and its charter will be perpetual, and its corrupting influence destroy the liberty of our country. When I came into the administration it was said, & believed, that I had a majority of seventy-five—since then, it is now believed it has bought over by loans, discounts, &c., &c., until at the close of the last session, it was said, there were two thirds for rechartering it.²

To Jackson's mind the most practical weapon at hand to administer a death blow was the removal of government deposits from the United States Bank. It was easier said than done and involved him in a dogfight within his own official family. Two successive Secretaries of the Treasury either demurred or refused to order such removals. A third finally subscribed to Jackson's dictum. While popularly referred to as a removal of deposits, as finally carried out this description is inaccurate. A simpler procedure was followed. No new deposits were made and the old ones were gradually used up under government withdrawals for regular outlays.

The result was pretty much as Jackson desired. The Bank had perforce to reduce its outstanding accommodations. Gradually its affairs were restricted and it went out of existence with the termination of its charter in 1836. Thus did the backwoodsman with no understanding of banking finally wreak his will upon the currency system of the country. Once again the fiery old warrior had triumphed.

The new Jackson policy involved depositing government funds in state banks throughout the country. While such action was hedged about with certain protective provisions, it gave rise to criticism that an old Spanish custom had been revived. It was said that politics had reared its ugly head.

This distribution of liberal deposits of government funds in the "pet

banks" subsequently had a particularly unfortunate repercussion. A great wave of speculation was gaining momentum throughout the country and the new deposits added credit resources which were used by many of the banks to increase speculative loans. The condition became acute in the West and Southwest.

While the fever of speculation took hold of business generally, the spearhead of the upward spiral was hectic gambling in land. Land held the same place in the speculative debauch of 1835-1837 as stocks did in that of 1927-1929. Partly accelerated by the distribution of deposits to "pet banks," sales of public land went from 4,658,000 acres in 1834 to 12,564,000 in 1835 and a year later reached 20,074,000 acres.

Public officials in government land offices connived with adventurers to promote speculative deals and promotions. Grandiose schemes were evolved. Typical was the New York and Mississippi Land Company, organized in 1835 to acquire a fabulous area of land in Mississippi. Inflamed public imagination clothed all land in a golden aura. Timber properties in Maine shared popular favor with building lots in the West. Parcels were traded again and again, on a scale of constantly rising prices. Prices up to \$78 per front foot were paid in 1836 for lots in Quincy, Illinois, and some in Peoria sold as high as \$100 per front foot. In Marion City, Missouri, the object of speculation was land all right—only it lay under six feet of water.

Failing in certain temporizing efforts to restrict speculation, the Treasury took a radical step on July 11, 1836, which effectively reversed its previous policies. The famous *Specie Circular* was issued. This letter instructed federal agents to accept only specie in payment for public land. "In issuing the specie circular . . . Secretary Woodbury declared that the order had for its object the repression of alleged frauds, the lessening of opportunities on the part of speculators to secure a monopoly of public lands to the injury of actual settlers in the new States, and the discouragement of the extension of bank issues and bank credits; he also briefly referred to the need of protection to the treasury."^a This final action of salutary intent came too late. Speculation had gone too far. Individuals, companies, and banks had already overextended their credit to the point where there was no going back. Effective retrenchment was impossible. Catastrophe was inevitable.

But before the panic of 1837 struck, the national government made one more move that further agitated the witches' brew of confusion. This was the distribution of the Treasury surplus to the states of the Union. For extraordinary governmental action, one will travel far down the reaches of history to encounter its equal. When first proposed, this project was

questioned on constitutional grounds. There was something definitely awry in a system that taxed people in a manner to yield a surplus and then returned such surplus to the people through another taxing authority.

A devious solution was finally pursued in order to avoid the constitutional difficulties involved in making an outright gift. Money was sent to the states in the technical form of a depository account. Even this interpretation is subject to qualification. Senator Benton, in describing the transaction at the time, said, "It is in name a deposit; in form a loan; in essential design a distribution."⁴

Some twenty-eight million dollars were actually sent to the respective states in amounts proportional to their representation in Congress. Many state officials resented the equivocal nature of the affair. That the funds were "deposits" in state treasuries was a most tenuous pretext. No one expected the states to return the principal. To this expectation the states have been completely faithful. Not one dollar has ever been repaid.

These two acts of the federal government, the issuance of the *Specie Circular* and the distribution of the surplus, added the last word in confusion to an already disturbed economy. The *Specie Circular* caused a flow of hard money to the West and a consequent drain on the banks of the eastern business centers. The latter were already overextended with manufacturing and commercial loans. Then early in 1837 the distribution of the surplus struck at the western banks because the formula of paying out according to representation in Congress meant a concentration of funds in the more populous states.

Thus within a period of six months the banks of both East and West were subjected to the strain of unexpected withdrawals of specie. "Millions upon millions of dollars went on their travels, North and South, East and West, being mere freight for the time being, while the business from which the money was withdrawn gasped for breath in its struggle with a fearfully stringent money market."⁵

This condition served only to accelerate the more fundamental movement which was rapidly reaching a climax. The overextension of credit both here and abroad reached its peak. Mass psychology had attained that point in the swing of the pendulum when the weight of an eyelash would start the broad swing in reverse. Rarely, however, are these great changes in business conditions isolated to one nation. Trade induces interdependency. Many of our expanded commercial commitments in the years 1834-1837 had been financed in London. Late in 1836, therefore, when some leading English firms found themselves in difficulty, the effects were felt here. By early 1837 the Bank of England was putting pressure on banks and foreign trading concerns in England to contract their loans. As a

COMMERCIAL RECORD.

LATEST DATES.
 London, April 1 | Liverpool, April 1
 Havre, March 26 | New Orleans, April 26

SALES THIS DAY AT THE STOCK EXCHANGE.			
100 shares	United States Bank	cash	100
20 do	do	do	100
100 do	do	do	101
100 do	do	do	101
100 do	do	do	101
150 do	do	do	101
50 do	Delaware & Hudson Canal Co	cash	67
10 do	Morris Canal & Banking Co	cash	45
10 do	do	do	44
5 do	do	do	51
10 do	Farmers Loan and Trust Co	cash	80
20 do	Ohio Life Ins. & Trust Co.	cash	85
105 do	do	do	100
50 do	do	do	87 1/2
10 do	Howard Insurance Co	cash	100
10 do	New York Insurance Co	cash	85
180 do	Harlem Railroad Co	cash	55
10 do	do	do	53
25 do	do	do	52
15 do	Boston & Prov. Railroad Co	cash	95
50 do	do	do	98
50 do	do	do	99
60 do	New Jersey Railroad Co	cash	84
50 do	do	do	85
100 do	Long Island Railroad Co	cash	60

REMARKS.—The banks yesterday afternoon agreed to suspend specie payments. Three banks had refused to do so, but this morning they determined before bank hours to come into the measure.

This course was forced on the banks by the unrestrained run upon them for specie, not only by bill holders, but depositors. We do not wish to indulge in any unnecessary animadversions on the conduct of any party, but it cannot be denied that the whigs were the principal cause of the demand for specie. No man can say Loco Foco-ism had any thing to do with it. Most of the withdrawals were in checks, for large sums, and in many instances the specie was sold to brokers for a large premium.

Financial news item in a New York newspaper on the suspension of specie payments and the outbreak of the panic of 1837.

result new commitments to American merchants were refused and payment was urgently demanded on outstanding obligations. This critical requirement for payment and shipment of specie was the last straw added to the burden of domestic speculation.

Faced with these conditions our banks were vulnerable. On May 8, 1837, the Dry Dock Bank of New York closed its doors. Three banks in Buffalo immediately followed. The run on specie had struck with full force.

On May 10th the banks of New York City suspended specie payments. Banks throughout the nation followed suit. Many of the "pet banks" folded up entirely. Business houses failed. Particularly hard hit were the large cotton firms in New Orleans. In place of the rosy optimism of a few months before, our people were carried away with fear. Only the direst contingencies were now anticipated. The herd was in stampede. The panic of 1837 was on.

The shock to the business system was severe. It may be measured by a report presented to President Van Buren by a committee from New York on conditions in that city: "the value of real estate in New York had in six months depreciated more than \$40,000,000; in two months there had been more than 250 failures; there had been a decline of \$20,000,000 in the value of the stocks of railroads and canals which centered in New York; the value of merchandise in warehouses had fallen 30 per cent; and within a few weeks 20,000 persons had been discharged by their employers." ^a Extend these figures to the country at large and it becomes obvious that this disturbance was an extraordinary shock to a young nation.

Our people made the usual mistake of expecting that this deep-seated business crisis would quickly correct itself. Lending color to this hope was a slight recovery in 1838 and another in 1840. These did not reverse the trend, however. As a result of our intense speculation and inordinate use of credit, the period of adjustment was prolonged. Liquidation carried on until 1842 when the low point of the depression was reached.

Serious as had been the economic illness of 1837-42 it could not stop the growth of the nation. Speaking broadly, the period from 1842 to 1860 saw a resumption of the powerful tide which had carried us forward during the preceding twenty years. Basic factors continued to favor us. Immigration, which declined sharply in 1843, was shortly exceeding its former proportions. In the five years ending in 1854 the annual average of newcomers was over 350,000. Our population went from seventeen million in 1840 to thirty-one million in 1860.

As the tide of immigration again reached flood proportions, so likewise did that of capital. English and European investors bought heavily of our railroad stocks and bonds. This assistance enabled us to increase our railroad mileage from about 2755 in 1840 to over 30,000 in 1860. Similarly English merchants made heavy advances to our commercial houses. Such influx of men and money coupled with the opening of new agricultural areas engendered another period of prosperity and boom during the years 1846-1857.

However the concluding financial and business event of this forty-year

period preceding the Civil War was another panic. The climax occurred in August of 1857 with the failure of the Ohio Life Insurance and Trust Company. Because of the concentration of the nation's banking in New York City the impact of this crisis was most pronounced in that community. Specie payments were once more suspended. Some of the larger western railroads went into bankruptcy. Credit retrenchment, however, was sharp and we were shortly able to resume our interrupted forward progress. By the year 1860 a condition of general prosperity had been restored. Optimism prevailed and businessmen looked forward to a future glowing with the promise of continued national growth and commercial expansion. To the discerning few, however, ominous clouds were gathering on the political horizon.

XVIII.

MINERAL MIRACLES—1840-1860

As our economy expanded under the impacts of improved transportation and factory production, the horn of plenty overflowed in yet another direction. Discoveries of rich mineral wealth rapidly accelerated our progress. The first great copper deposits of Michigan were opened up in the early 1840's. Free gold was discovered near Sutter's Fort, California, in 1848. An event of even greater portent occurred eleven years later when America's first oil well was brought into production. In the same year silver was found in the hills of Nevada. There was also some development of lead mines in Illinois, Wisconsin, and Missouri. These were not inconsiderable accomplishments in themselves. When coupled with the other developments of these years, they constituted an extraordinary sequence of events.

The story of the California gold rush has been retold innumerable times. Its significance from the business standpoint was considerable. In 1849 gold shipments began flowing into the port of New York at the rate of about five million dollars per month. By 1860 nearly \$600 million had been recovered. This was a substantial increment. The average annual addition to the world's gold chest during the ten years ending in 1860 was approximately ten times the average increase in the decade ending in 1840. Such expansion was due almost entirely to the California and Australian fields. The net effect, of course, was that the world's supply of money was vastly expanded at a most opportune time to keep pace with the increase in production of goods and accelerated business turnover as steam power was applied to manufacturing and transportation.

The stampede to the gold fields of California is noteworthy in various ways. Few people got rich. By far the large majority of miners eked out only the means of bare survival. On the other hand the traders who supplied these free-spending adventurers did relatively well. From their small stores of capital were later to come great events in commerce and railroad building. Clipper ships were in great demand and for a few years this

form of transportation reaped a rich harvest. Furthermore this magnet of the Mother Lode drew to the Pacific Coast an effective nucleus of settlers to start the real growth of that territory. In the year 1850 alone, some 100,000 persons passed in through the Golden Gate. Pursuing the course of least resistance these prospectors stayed on and drifted into other occupations as they found that the gold-bearing gravel beds yielded only meager wages instead of riches. A few followed the example of the local hacenderos and raised cattle. The great majority became farmers, merchants, and artisans. Agricultural production mounted and the East began to hear the first echoes of that siren call, "our climate." A swelling tide of settlers responded; the rise of our Pacific Empire had begun.

Unlike the California gold rush, the opening of Michigan's copper treasure proceeded at a restrained tempo. This story took some 200 years to unfold. It could well be called the Great Continental Mystery Story. Beginning with the arrival of the first settlers on the Atlantic Coast, its climax did not come until the 1840's.

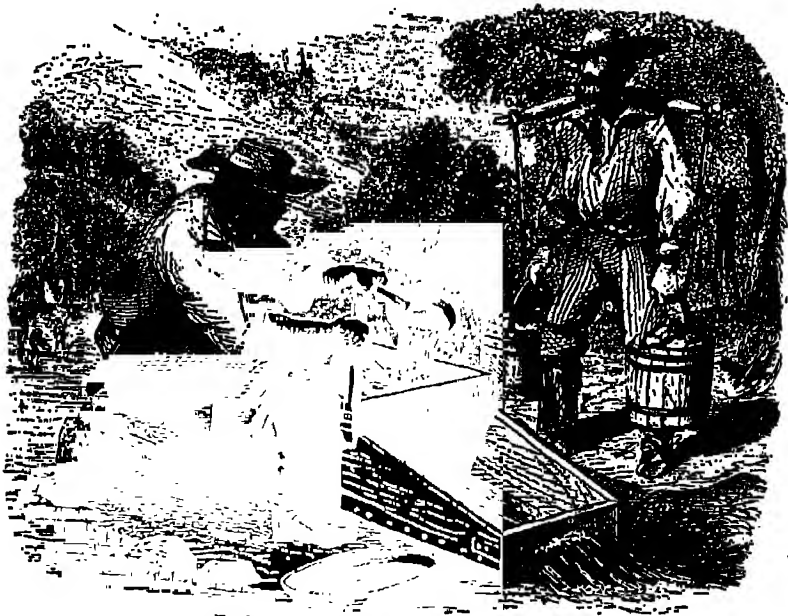
One of the things which had made a striking impression upon the early colonists in America was the existence of copper ornaments among the Indians. Naturally these pioneers were not slow to ask the question; where did the red metal come from? Jesuit missionaries unearthed the first clue to this mystery as they journeyed westward, visiting one Indian tribe after another. These observing explorers recorded the fact that the use of copper ornaments increased as one proceeded westward. As they approached the country around Lake Superior they noted the use of copper not only for ornaments but for utensils as well. Indians, when questioned on the subject, always refused to disclose the source of their treasure. By that time they, too, had been around a bit. Putting all available facts together, it was a reasonable assumption that copper lay somewhere in the neighborhood of Lake Superior.

Many persons searched for the source. In 1770 one Captain Jonathan Carver, financed by English capital, led an ambitious prospecting party into the Keweenaw Peninsula of the Lake Superior territory. There in the Ontonagon River the party found pebbles and small boulders of native copper. The scent was getting hot. Nevertheless little was done about it for the next seventy years.

Then Steven T. Mason, the first Governor of the State of Michigan, appointed Douglass Houghton as state geologist. Houghton's qualifications seem to have been that he was trained as a physician and belonged to the right political party. Whatever were the reasons for this choice, they are recommended to those who would employ geologists. Houghton succeeded in locating beds of copper. The great mystery was solved. His report, sub-

mitted in 1841, marked the beginning of modern copper mining in the United States.

This Keweenaw Peninsula was a treasure-trove of mineral riches. It yielded three great stores of copper. First was the "native" copper, mined for about a decade after Houghton's brilliant discovery. Then in 1851 a more abundant source was uncovered in the amygdaloidal deposits scattered through beds of old lava. Finally the climax came in 1861 when E. J.



Early gold mining in California
New York Public Library Picture Collection

Hulbert discovered the conglomerate copper formation which gave the world one of its most renowned mining enterprises—the Calumet and Hecla Mining Company.

Development of the Hulbert project called for substantial capital. To raise this he repaired to Boston. In so doing he forged a new link in an interesting chain of events. As we have seen, shipbuilding had given New England a copperworking business. Brass hardware followed. Early shipments of Michigan copper naturally went to New England. Paralleling this was the fact that the accumulations of capital formed in the trading days had by this time been multiplied many times by the success of New Eng-

land's new cotton textile industry. Boston was the center in which New England capital sought outlet in new ventures. In applying to Yankee capitalists Hulbert was therefore following magnetic lines of force. Bostonians put up \$1,500,000 to finance Calumet and Hecla. During the fifty years between 1871 and 1921 this property paid dividends of over \$150 million. For many years Boston capital was the dominant financial power in the American copper industry.

These mineral treasures from California and Michigan were great contributions from the West. The East, however, was not to be outdone. In August, 1859, Edwin L. Drake brought in the country's first oil well at Titusville, Pennsylvania. In much the same way as in the copper mystery story, the discovery of oil in this country harks back to the red men and their customs. Seneca Indians were the first American "oil men."

Abroad, mineral oil, while rare, was not an unknown product. For many hundreds of years the Burmese had produced and sold petroleum in Burma, India, and China for use in small lamps. As early as the seventeenth century this "Rangoon Oil" was an article of commerce in London.

The existence of oil exudations in America had been known to some of our first explorers. Seventeenth-century missionaries reported having discovered a "Fontaine de bitume" and having observed a "heavy and thick water, which ignites like brandy and boils in bubbles of flames when fire is applied to it."¹ Along the Genesee River in New York and Oil Creek in Pennsylvania, seepages of oil were particularly noticeable. Here it was that the Indians started in the oil business. Their practice was to throw a log across a small stream near one of these exudations and back up the oil on the surface of the water. This would then be soaked up in blankets which were wrung out into containers. The product was used for dressing wounds and for certain tribal rituals. It was also traded to the colonists as a medicament and became rather widely known as Seneca or Genesee oil.

For well over a century, or until the 1850's, nothing of importance happened. Suddenly two developments opened the way for one of the twentieth century's greatest industries—the oil business as we know it today. First we evolved a method of refining rock-oil and using the product as an illuminant. Then in 1859 E. L. Drake at Oil Creek, Pennsylvania, worked out the process of drilling for oil instead of digging wells.

These discoveries were opportune because about this time it became apparent that the sperm whale had ceased to cooperate as a source of illuminating oil. Unoblingly these great mammals had retired to ocean areas as remote as possible from New Bedford and Nantucket.

Whale oil was both scarce and costly. It sold for upwards of two dollars per gallon.

Meanwhile substitutes were being sought through experiments over a wide field. Various kinds of so-called "burning fluids" were evolved using both alcohol and turpentine. They were expensive as well as dangerous and caused many accidents. Working on the same problem, the Scotch evolved methods for distilling oil from coal. On the adoption of the process in this country the resultant product was named kerosene and considered an illuminant of fair quality.

Samuel Downer of Boston was a pioneer in this intermediate phase between whale oil and refined petroleum. As a manufacturer of sperm-oil

1848
DISCOVERED
IN BORING FOR
SALT WATER
near
THE
Bank of the Allegheny River,
ALLEGHENY COUNTY, PENN'A.
about **FOUR HUNDRED FEET** below
the Earth's surface, is pumped up with the Salt Water, flows into
the Cystern, floats on top, when a quantity accumulates, is drawn off
into Barrels, is bottled in its natural state without any preparation
or admixture. For particulars, get a Circular.
Pittsburgh, PA. 1848
P. M. Kier, Proprietor

Kier's advertisement of "rock-oil" as a cure-all
From *The Pageant of America*, copyright Yale University Press

candles, he saw the handwriting on the wall and became interested in the possibilities of "coal oil." He purchased the United States Chemical Manufacturing Company and before long his plants were annually distilling 650,000 gallons of coal oil, or kerosene. By 1859 some fifty firms with an aggregate capital of almost four million dollars were engaged in refining kerosene.

In the excitement precipitated by the discovery of this process for the distillation of oil from coal it was inevitable that some thought should be given to the possibilities of refining petroleum by a similar process. Samuel Kier of Tarentum, Pennsylvania, first achieved success in this project. The Kier family operated canal boats on the "Main Line" between Pittsburgh and Philadelphia. They had also branched out into salt production, having drilled salt wells at Tarentum. One of these was ruined by an

inflow of rock oil. Samuel Kier was not to be discouraged. Instead of writing off this well as a loss, he decided to find a market for the oil. Citizens of many communities were soon to read flamboyant advertisements telling of the great medicinal properties of "Kier's Petroleum or Rock Oil, Celebrated for its Wonderful Curative Powers—A Natural Remedy."

Nature's bounty, however, began to tax Kier's ingenuity. He saw that rock oil dispensed in eight-ounce bottles, even if applied liberally by Eskimo and Hottentot, could not possibly consume the quantities of oil that seemed available. A new and more extensive use must be found if real money were to be made in selling this strange liquid.

Accordingly Kier began experimenting to produce a satisfactory illuminant from petroleum. Some kind of refining was obviously necessary. In its raw state petroleum burned imperfectly, giving off quantities of smoke and offensive odors. He sent an employee to England to secure data on coal distillation. This mission proved fruitless. Finally Kier consulted J. C. Booth, a chemist of Philadelphia, and between them a rough process of distillation was worked out. In 1850 a crude still of one-barrel capacity was set up which yielded a refined oil of fairly satisfactory quality. This product was called "carbon oil" and was retailed at \$1.50 per gallon. Thus Samuel Kier, the irrepressible promoter and small-time capitalist, became America's first oil refiner. With his diminutive still of scarcely laboratory capacity he had planted the acorn from which the great oak of modern oil refining was to grow.

Public acceptance of carbon oil as an illuminant was slow. Habits are hard to change. Furthermore many people had been victimized by irresponsible promoters of various types of "burning fluids."

Outstanding for his success in adapting for practical use the crude carbon oil which Kier and some others were refining was A. C. Ferris of New York. He developed a more efficient burner and utilized a solution of caustic soda to destroy the offensive odor of the original product. He even offered a free trial of lamp and oil to prospective customers. Still there were many who remained skeptical.

Slowly but with gaining momentum carbon oil made its way in spite of being imperfectly refined. A new product had been evolved for which the whole world was a potential consumer. A use for rock oil had been found which gave promise not only of consuming the current supply but of necessitating the production of undreamed-of quantities. Ferris's sales in New York alone were exceeding Kier's original output at Tarentum. The first requirement had been met—a new market had been opened. The time was now ripe and the stage set for the next great development.

The sequence of events leading to its accomplishment had started in an

entirely unrelated way along Oil Creek in Venango County, Pennsylvania. Brewer, Watson, and Company, while operating a saw mill in that area, had found oil exudations upon their property. Having tried the oil in a crude lamp and also as a lubricant, Dr. Francis B. Brewer, a member of this firm, exhibited samples to Dr. Dixie Crosby of the Dartmouth Medical School. These samples were also shown to George H. Bissell, a lawyer-promoter of New York City, who was at once seized with the thought of launching a company to undertake the production and marketing of this raw product from the Oil Creek pools.

Bissell and his partner, Jonathan G. Eveleth, also of New York City, secured the cooperation of some New Haven capitalists, notably James M. Townsend, President of the City Savings Bank. Arrangements were made for taking over the Hibbard farm on Oil Creek upon which appeared the seepages of petroleum. In 1854 they formed the Pennsylvania Rock Oil Company of New York with a proposed capital of \$250,000.

Bissell and Eveleth found great difficulty in organizing the new enterprise. In perfecting their plans they hit upon the idea which has since become standard practice by promoters who face a tough selling job. They would secure the report of experts. For this purpose they retained Luther Atwood of Boston and Professor Benjamin Silliman Jr. of Yale. These gentlemen were not only expert in science but in dealing with promoters as well. Silliman insisted upon full payment of the fee before releasing a report which endorsed the practicability of refining rock oil.

Progress was slow, however, and the panic of 1857 retarded their program. Nevertheless in that year, under the leadership of James M. Townsend, they were ready for action. It was decided the time had come to start production on Oil Creek. At this point Townsend chose E. L. Drake of New Haven, a former railroad conductor, to work for the firm. The reasons for the selection have been stated . . . "Since he was idle and could obtain a free railway pass . . ."

When Drake went to work, he first followed the current practice on Oil Creek, which was simply to dig open pits near the seepages and hope that they would fill with more oil than water. Fortunately for the industry the Drake pits seemed to fill with nothing but water. He decided that other means would have to be followed. This was the crucial point around which has grown a legend in the oil industry.

When George Bissell was peddling the stock of the Pennsylvania Rock Oil Company in New York, he, too, had been giving thought to some way of increasing the take of oil along Oil Creek. One day as Bissell stopped before a drugstore a coincidence occurred. There in the window was an elaborate display proclaiming the merits of Kier's rock oil, a specific

for all human ills. Included in the display was a picture of the derrick over Kier's salt well at Tarentum, the source of the miracle-working rock oil.

As Bissell looked at the view of the derrick, an idea struck him. If salt brines could be mined by drilling wells instead of digging them, why would not the same be true of rock oil? This may well have been the original conception of the idea of drilling for oil.

Drake lost no time in trying out the idea. Within a shaft only a few inches in diameter, he believed he could sink a pipe which would prevent the inflow of surface water and permit the oil to come up undiluted from greater depths. Drake hurried down to Tarentum, the scene of Kier's oil-exuding salt wells. When he explained that he had in mind drilling for oil, the old hard-headed salt drillers laughed him to scorn. Who had ever heard of drilling for oil? These practical men would have nothing to do with any such crack-brained scheme.

Drake would not take "no" for an answer. Finally he persuaded W. A. Smith, a blacksmith who made drilling tools, to go with him to Oil Creek. Together these two started drilling. Everything had to be improvised. Progress was slow. The first thirty feet of the drill-hole were lined with cast iron pipe.

In addition to his operating problems Drake was now beset with those of a more harassing nature—financial ones. After having advanced \$2500 New Haven capitalists decided they would go no further. Drake, however, did not lose faith. He put up his own last \$347 and borrowed \$500 more on his note. Thus Drake and Smith were able to keep sinking their drill-hole foot by foot, never quite knowing when they would have to stop. Farmers along Oil Creek began to feel sorry for these demented strangers.

Eventually there came a fateful Saturday late in August, 1859. They had drilled to what would now be considered no depth at all—a bare sixty-nine feet. That day, just as they were knocking off, the drilling indicated that a different formation had been penetrated. No significance was attached to this. The men pulled up their tools and quit for the day.

Late Sunday afternoon "Uncle Billy" Smith, taking a busman's holiday, went out to their Oil Creek well. He could hardly believe his eyes. The drill hole, which the night before had given no such indication, was full to overflowing with oil. This was it! Smith sent his son to tell Drake. Then the news spread like wildfire. The cry went over the countryside, up and down Oil Creek—"The Yankee has struck oil."

This was a triumphant outcome for Drake. The drilling process was a proven success. They were getting oil and not water. With the aid of a hand pump the well was yielding only a pitiful eight barrels of oil per day.

But the event was of great significance. This was the beginning of American crude oil production. Drake's unswerving faith had been justified.

Thus within a few years American enterprisers, working independently on what mossbacks of the time called hair-brained projects, fulfilled the two basic essentials for the development of the oil business. From Drake's little well and Kier's tiny still has grown a mammoth modern industry almost within two generations. Production of crude oil has gone from eight barrels per day to over five million. From an investment of a few thousand dollars, this industry now represents something around \$18 billion, with employees numbering 1,250,000. From the little spark of chemical knowledge gained through Kier's original refining experiments have developed a myriad of useful products. One hundred octane gas for aviation, butadiene for synthetic rubber, and toluene for explosive are direct descendants. How truly did those early medicine-men wagon-salesmen speak when they proclaimed Seneca oil as a worker of miracles!

XIX.

THE CIVIL WAR

Ships, Wheat, and Factory Wheels Sustain the North

IN the two generations which followed the adoption of the Constitution the young nation grew mightily. Already possessing vast lands stretching to the Mississippi and beyond, the Louisiana Territory was added. Then we secured Texas, California, and Oregon. We became a two-ocean nation. Seemingly everything was present to make us a great world power.

One basic and ever-increasing weakness, however, marred this sweep of progress. This lay in the difference of economic interest between the North and the South. Citizens of the states later to become the Confederacy had staked everything on a one-crop, large-plantation, slave-labor economy. As the price of cotton went, so went everything in the South. These people had set up an economic oligarchy—a genial but exclusive society. The impecunious white immigrant had little hope of becoming a member.

Settlers in the North, on the other hand, went in for varied crops and diversified industry. Theirs was a land of hopeful promise to the small farmer and hard-working artisan. An active domestic trade and broad foreign commerce offered almost unlimited opportunities. The North was truly democratic in its economy. It extended arms of welcome to the peasant and laborer of Europe, proclaiming in effect: "No man so poor that he cannot here achieve proprietorship." As a result the incoming resources of man power had been very largely channeled to the North which by 1860 had a population of twenty-two million while the South had only about nine million, including more than three and one-half million slaves.

The northern states were also fortunate in possessing many excellent ports, nearer to the markets of Europe than the South's principal outlet at

New Orleans. Connecting these ports with rich agricultural areas, the North had built a system of inland transportation comprising the Erie Canal, the New York Central, the New York and Erie, the Pennsylvania, and the Baltimore & Ohio railroads.

In the South railroad transportation was poor in comparison. There were no long through railroad lines except one which connected Chattanooga, Memphis, and Nashville with the Atlantic seaboard. The South had in the main depended on its water routes supplemented by short feeder railroad lines to tidewater ports. For moving cotton to shipside the system was practical. For the later problem of shipping men and supplies from one war front to another it was woefully inadequate.

Even in agriculture the South, comparatively speaking, was losing ground. In the North the new midwestern farming communities had developed export commodities challenging even King Cotton. Wheat, flour, and meat products were moving by rail and water to Atlantic ports in an ever-increasing volume. The greatest disparity of strength, however, was in manufacturing. The South's small manufacturing establishments accounted for only 8 per cent of the nation's manufactured products.

To the southern planter-statesmen these facts made dismal reading as the year 1860 approached. They had built their entire economic system on a base of slave labor. Their power in Congress had so far assured its protection. But as the North increased its lead in population and productive wealth, these southerners saw the handwriting on the wall. Economic ascendancy must inevitably carry with it political ascendancy.

Political domination by the North meant the end of the slave system. This would be tantamount to a disastrous confiscation of capital and would destroy the keystone of the southern economy. The prospect of this dual blow against political prestige and pocketbook was intolerable. The bonds of Union were galling on exposed nerves. Such Union must be dissolved.

In appraising their prospects for success in the event that secession should result in armed conflict the planter-statesmen were confident. They reasoned that the need for their cotton would bring the whole of Europe begging to the levees of New Orleans. They could thus command the economic resources of England and France. This exaggerated estimate of the position of cotton is highlighted in a frequently quoted speech by a prominent southerner: "Without firing a gun, without drawing a sword, should they make war on us, we could bring the whole world to our feet. What would happen if no cotton was furnished for three years? . . . England would topple headlong, and carry the whole civilized world with her. No, you dare not make war on cotton . . . cotton is king."¹

Only by keeping in mind this point of view is it possible to understand the assumption of a risk of war on the part of the South. They would fight with bales as well as with bullets. With English support success was certain. They would create a new American nation of homogeneous economic interest to perpetuate the planter oligarchy.

While the cause of the Confederacy received much sympathy in England, it failed to secure the expected recognition and assistance. The "shop keepers" of John Bull's island are traditionally realistic. They read the census returns and paid homage to the factors that gave the North its growing population, booming industries, fine transportation system, great merchant marine, excellent foreign trade, and liberal supplies of precious metals. While the South provided England with cotton, the North supplied foodstuffs. Finally, the English businessmen realized the North was by all odds the best customer for English goods, able to pay gold on the barrelhead.

It was the business world which received the first shock of impending trouble. The election of Lincoln in 1860 touched off the powder train. Banks in the South began to withdraw balances from banks in port cities of the North. The usual remittances by southern storekeepers to northern merchants dwindled to a trickle. By early 1861 even this trickle had stopped.

When Sumter was fired on in April, 1861, business in the North was in the grip of a full-fledged depression. It has been estimated that southern merchants owed their northern brethren at this time something around \$300 million, of which New York firms alone claimed \$160 million. The failure to receive remittances against these balances coupled with fear of complete loss caused a mercantile panic. Money became tight, collections were pressed, and payrolls drastically reduced. Business failures spread through the northern states like an epidemic. It was estimated that upwards of 10,000 concerns, large and small, went to the wall. This shook the northern economy to its foundations. Business was sick indeed.²

Serious as were these shocks, the banking system of the North stood up fairly well. The banks in New York City and New England were able to maintain specie payments, but banks in Philadelphia, Washington, Baltimore, and St. Louis were forced to suspend, as also were most of those in the newly opened frontier communities. In the South, suspension was general except for the banks of New Orleans which had through the years built up liberal specie reserves.

When hostilities actually broke out, each side failed in appraising the other's strength of purpose. Accordingly the officials of both the Union and the Confederacy prepared only for a struggle of a few months' dura-

tion. The first year of conflict was carried forward in the belief that the war would soon be over.

As these hopes failed to materialize, both sides found themselves under greatly changed economic conditions. By the spring of 1862, government war expenditures by the North had turned business conditions from depression to prosperity. The output of iron and coal was forced into higher figures than ever before. Production of woolen cloth became a great war industry. There was a heavy demand for western foodstuffs both for domestic and foreign consumption. The railroads were doing a land-office business. Prices were rising and employment mounted. In February, 1862, the federal Treasury began issuing paper money in the form of legal tender notes, later to be known as "greenbacks." Inflation took hold moderately. The North was fully launched on a war boom. Many people were making more money than ever before. This state of affairs endured throughout the war.

In the South, however, things took a more ominous turn from the very outset. The northern blockade not only greatly retarded the export of cotton but it stopped imports, the two sources from which the Confederacy had expected to secure a substantial portion of its domestic tax revenue. Failing in this, reluctant to fix realistic taxes on its people, and unable to do much with loans, the Confederacy could pay its bills only through repeated issues of notes. These mounted like a forest fire. Prices raced upward and a ruinously high degree of inflation prevailed to the end of the war. To put it briefly, the North prospered under conditions of moderate inflation and active foreign trade. The South suffered under those of intense inflation and practically no foreign trade.

The continuance of overseas commerce by the North through open ports contributed greatly to ultimate success. The bulk of its exports were agricultural products from the Midwest. That it was able to produce a surplus was due to the restless genius of those men from the prairie states who provided the new farm machinery; men like Cyrus McCormick and John Deere. Fewer hands could do more work. Harvesting of crops could be maintained as thousands of men took up arms.

At the same time it must be admitted that this foreign trade of the North was favored by great good fortune. An unusual demand for our grain was created by the partial failure of crops in England in the years 1860-62. In consequence, the surplus of our Midwest farms flowed eastward through the port of New York to provide 40 per cent of England's cereal requirements. This was an important factor in England's economy. Britain balanced one consideration with another. King Cotton proved to be less powerful in Liverpool than Queen Wheat. For Britain's neutrality,

the North could give credit to its free labor system, farm machinery, the Erie Canal, and its trunk line east-west railroads.

As the war progressed, the North was destined to suffer one particularly damaging blow to its economic resources—the loss of its merchant marine tonnage to foreign ownership. This came about as a result of the success of rebel raiders on the Atlantic. Two of these, the *Florida* and the *Alabama*, were built in English yards and were manned with English seamen. They were the first steam vessels to be used as commerce destroyers. While fast clipper ships under a favoring breeze could give the *Alabama* a real race, in the end sail could not keep up with steam. Consequently Captain Semmes of the *Alabama* was able to destroy some twenty northern merchantmen in a single trip across the Atlantic.

The effect of this Confederate success at sea was immediate. No shipper would risk a cargo under the American flag, except in the direst emergency. As a consequence, northern shipping men faced a Devil's choice—idle ships or sale to foreign registry. Many followed the latter course and a surge of transfers took place. This was a damaging blow that the *Alabama* struck. Seldom, if ever, in all naval history has one ship wrought so much damage. "For the time being, the stars and stripes vanished from the Eastern seas. Our ships could procure no cargoes. . . . Many of these vessels were sold to foreigners at one-half or one-third their cost. . . . Altogether in the four years of the war we lost to alien flags 751,595 tons of shipping, or nearly one-third of our entire fleet registered for deep sea carrying."*

Distressing as were these losses in ocean transportation, we more than made good on land. The war years constituted a period of golden harvest for our fledgling railroads. Extraordinary traffic movements put them years ahead financially. Profit-making became general during critical years of growth. Dividends were paid by roads that except for the war might have disintegrated into streaks of rust across great open spaces.

The outstanding factor in this prosperity was the movement of grain and meats from the Midwest to consuming centers of the East and to Atlantic ports. This gave the long east-west railroads a chance to fatten up. The New York Central, the Erie, the Pennsylvania, and the Baltimore & Ohio did a great business. For many railroads business increased 100 per cent during the war. While freight rates tended downward, profits went up in dazzling figures. The price of Erie stock rose within three years from 17 to 126½ and in the same period that of the Hudson River Railroad went from 31½ to 164. Railroad securities, which had formerly been regarded as symbols of the wildest kind of speculation, became highly rated investments.

Spectacular battles between rival capital groups for the control of railroad properties occurred during these years. Outstanding among such developments was the entrance of Cornelius Vanderbilt into the railroad field. Having made a substantial fortune in steamship operation, he then acquired control of the New York & Harlem Railroad and its competitor, the Hudson River Railroad.

In actual construction of new track, the war years fell considerably behind former peacetime records. Some small stretches were undertaken on the Union Pacific and Central Pacific. One ambitious construction job to be carried forward was the building of the Atlantic and Great Western Railroad which was later to become part of the Erie. It ran from western New York State to the new oil fields in Pennsylvania and thence into Ohio to Cleveland and Cincinnati. Foreign investors, largely British, showed their confidence in the North by advancing \$25 million for the construction of this road during the war. Some 15,000 laborers were imported to carry on the work.

Another development in our transportation system during the war years was its organization around the two great poles of traffic, New York and Chicago. This pattern has prevailed ever since. As we have already seen, the Erie Canal had given New York City a great lead over other Atlantic ports. But prior to the war Chicago had not established its supremacy in the West. St. Louis, Cincinnati, and Louisville were by heritage older claimants to commercial leadership. They were active ports on the great inland waterway, the Mississippi system. It was the ambition of their citizens that the bulk of western produce should go to world markets over this system or down this valley and out through the port of New Orleans.

As a traffic threshold for the prairie states, Chicago was more favorably situated. The water route via the Great Lakes, the Erie Canal, and the Hudson River was shorter to European markets and much more direct to centers of manufacturing in the East. Not only that, but railroad builders found it easy to come into Chicago with trunk lines from the East, and with radiating feeder lines from the West. Shortly after the Civil War there were three main lines running into Chicago from the East and seven lines from the prairie areas of heavy grain production.

Another blow to the ambitions of the river ports was struck when the Mississippi was closed to traffic in the early days of the war. Farmers who had previously shipped their hogs to Louisville, Cincinnati, and St. Louis now began to send them to Chicago. The packers in that city more than trebled their business. New plants were erected and the Union Stock Yards was established. Wheat shipments doubled and additional grain elevators were erected. From this time onward the Windy City was to

have no rival as a traffic center for prairie products and as the metropolis of the West.

One of the most significant events of the war years was the passage of the Homestead Act by Congress in 1862. This was for all practical purposes a procedure for subsidizing western settlement. Any citizen over 21 could secure a holding of 160 acres by residing on it for five years and paying certain nominal fees. With such a lodestone to draw them, land-starved workmen from the British Isles and Europe continued to come in on every ship.

Added stimulus to this continued western migration was given by new discoveries of precious metals in the Far West. In 1859 the rich gold and silver of the Comstock Lode was opened up in what later became Nevada, and Virginia City sprang into being. Gold was also uncovered in Colorado, Idaho, and Montana. These events caused a furor of interest throughout the North and even in England. Hectic promotions of mining enterprises went on in all large cities of the East.

Even as the great armies of the North and South were locked in critical combat, pioneers of the Midwest pushed on to the mountains as miners and settlers. It was really an extensive migration. One traveler in 1863 coming back east from Colorado over the Kansas road reported that he had met an average of 500 wagons a day forging westward. In the year 1864 some 75,000 persons passed through Omaha on their way to the mines and new western communities. Thus the Civil War years saw the active settlement of that area later to become the Rocky Mountain States of Montana, Idaho, Nevada, and Colorado.

In the East, meanwhile, war demands for goods had greatly stimulated industry. This expansion was fostered by another and more enduring force. In the campaign of 1860 the Republicans had stressed the protective tariff and because of the absence of Democratic senators after the secession, they were able to pass the Morrill Bill in February, 1861. Although moderate in its increases of duties, it was interpreted as a victory for the principle of protection. In the preceding decade southern statesmen had succeeded in having average duties reduced to the lowest levels since 1815. The Morrill Tariff was amended in 1862 and 1864. All in all duties were substantially increased. The protectionists were definitely in the saddle.

The infant industry to respond most lustily to the stimulus of the new tariff was that of iron and steel. During the war production was concentrated in New York, New Jersey, and Pennsylvania, with Pittsburgh occupying the leading position. Crucible steelmaking really got under way as we commenced turning out uniform quality in small quantities.

We began to satisfy our own needs in iron rails, which went from 205,000 tons in 1860 to 356,000 tons in 1865. There were in addition during these years two other significant "firsts." The Bessemer process was tried, and there came upon an unsuspecting industry one who was to dominate it for practically the remainder of the century—Andrew Carnegie.

In the war years other manufacturing industries, except that of producing cotton cloth, also went into new high levels of activity. "The impetus to production given by the Civil War increased the number of establishments 79.6 per cent during the decade of the 'sixties, and the number of wage earners 56.6—the largest relative advances made in any decade of our history." 4

One of the most sensational war activities was that of making woolen cloth. When the war broke out, the North only had uniforms for an army of about 13,000 men. By 1864 some one million had been mobilized. To provide clothing was a mammoth task. Every manufacturer of woolen cloth and everyone who thought he could make cloth was pressed into service. As a result, harassed, overburdened members of the Quartermaster General's Department were frequently victimized by unskillful and unscrupulous manufacturers. There were many profiteers who made large sums turning out inferior cloth. They became known as the "shoddy aristocracy."

The pressure of war needs for more goods served to advance the mechanization of industry. An outstanding development of this type was the application of the sewing machine to the making of shoes. In attaching uppers to soles, one man was now able to complete several hundred pairs in a working day. During the first year of using the new device the industry doubled its highest previous output. The sewing machines were operated in batteries by steam power and at once made it advisable to centralize all shoemaking operations at one spot. This resulted in the fully integrated shoe factory with which we are familiar today.

The most spectacular business development of the war years was the mushroom growth of the production and refining of petroleum. Stemming from humble beginnings in the 1850's when Kier developed his first primitive still and Drake drilled the first well, it now became almost overnight a lusty, brawling industry—the problem child of the business family. The few shallow wells which had thus far been developed yielded oil only by pumping. With the crude pumps then in use it was a slow, arduous process resulting in small production. Then suddenly, on a quiet spring afternoon on John Buchanan's farm near Oil City, Pennsylvania, the primordial forces of the nether regions broke loose. Drillers brought in America's first gusher. Like a volcanic eruption oil spouted out in a great geyser.

Completely out of control, oil was drenching the countryside at an estimated rate of 3000 barrels per day. A milling crowd thronged the site. Then disaster struck. The flow ignited and the fires of Hell seemed to be belching from the earth. Many people were killed or burned. Finally the fire was smothered and oil men could draw breath and take stock. In the fall, on nearby farms, other gushers came in including the Empire and Phillips number 2, both with over 3000 barrels per day. It was impossible to store the output and only a small portion was saved. This astonishing production drove the price of oil down from \$10 to 10¢ per barrel. To remedy this situation, the Oil Creek Association was formed. Production was restricted and minimum prices established. Thus did the industry cope with a problem which was to dog it recurrently for many years.

Operating conditions were incredible. Nature had been overbountiful—she had delivered too much and too soon. Our equipment was inadequate and our handling procedures primitive. The worst problem was that of transportation. At the outset there was no railroad into the oil fields. A great deal of the product was taken out by barges which descended Oil Creek to the Allegheny River and thence floated down to Pittsburgh. Oil Creek, however, was a waterway of thin and straggling volume, a fact which gave rise to one of the strangest practices in our industrial history. This was the “pond freshet” method of oil transportation.

A multitude of small barges would be loaded with wooden barrels of oil at the wells along Oil Creek. In the meantime on the stream's upper reaches a series of lumbermill dams would be closed to store up a supply of water. At an agreed time all these dams would suddenly be thrown open, and a roaring torrent of floodwater would come tearing down Oil Creek. At its approach the loaded barges would be cut loose. The swirling waters would sweep away the fleet of barges in a tumbling mass like logs in a timber jam. Sweating, swearing helmsmen strove mightily to prevent collision or grounding on rocks. It was a chaotic maelstrom of barges and barrels. The greater part of the fleet would be borne through to the Allegheny. The rest would be scattered over the landscape around Oil Creek in a wreckage which looked as though a hurricane had struck. The cost as measured in oil, barges, and whiskey was excessive.

A saner but slower practice was to cart barrels of oil twenty-five miles to the railroads. This system at one time employed some 6000 teams of horses, pulling wagons loaded with five or six barrels each. Hauling charges ran between \$2 and \$5 per barrel. In 1862 the transportation problem was solved when Thomas Struthers and others built the Oil Creek Railroad to connect the Philadelphia and Erie with the fields at Titusville. Then in 1865 Samuel Van Syckle built our first oil pipe line. It was five

miles in length. This pipe line was later the occasion whose business it threatened to ruin.

It is an interesting coincidence that upon this scene met two of the great leaders of modern industry. Andrew Carnegie and John D. Rockefeller took up son of John D. Rockefeller. Carnegie smiled and Carnegie gathered a sum adding materially to that small pool of capital which he had shortly multiply many times as he came to dominate the oil business. Then in 1863 a quiet-spoken, unobtrusive young person entered the business of oil refining. John D. Rockefeller, of age but already possessed of some capital, assisted by his firm of Andrews, Clark, and Co., which erected a refinery in Cleveland. In later years, Rockefeller in telling about his field, said, "so . . . the two Clark brothers attached themselves to me, and Maurice Clark affixed himself to me on the day I agreed with him that we'd go in and contribute our own capital and be the 'Company' in the concern, thinking that as a side-issue, we retaining our interest in the business as private merchants." Within twenty odd years this "little side issue" grew into the great Standard Oil Trust, one of the most powerful aggregations of industrial power the world has known.

In the meantime due partially to the restrictive provisions of the oil drillers already noted, prices were held between \$1 and \$2 a barrel. This spelled undreamed-of profits. It looked like a flow of liquid gold. The country was galvanized with an intense excitement spread from Maine to the Mississippi.

The spotlight of public interest was suddenly turned to the oil-bearing regions of Titusville, Corry, Oil City, and Franklin. Overnight they became hell-roaring boom towns. Fortune hunters swarmed in to secure land, leases, or rights at the wells. Many small fortunes were made when luck favored the oil men. Tales of these successes were misreported and spread throughout the nation. In spite of the fact that the oil men of the North were engaged in the death struggle for the control of the Union, a wave of speculation passed through the oil industry. The time the excitement subsided after the war, it has been estimated that some 1000 companies with a paid-up capital of \$90,000,000 started to look for oil not only in the Oil Creek fields of Pennsylvania but in the nearby states.

Irrespective of the speculative boom in oil company stock, the most important thing to note is that during the war the nation

major industry. In the year 1860 we produced some 500,000 barrels of petroleum. An export market was developed, and in the first quarter of 1862 the port of New York alone exported some 1,500,000 gallons of rock-oil products. "No article of commerce has in so short a period of time ever made such rapid strides into the first ranks of valuable earth products as this." ⁶

The suddenness with which this occurred is striking. Within the decade ending in 1864, Kier had worked out his refining process, Drake had drilled the first well, and his followers had brought in the initial flush production. Securely in our hands was the key to one of nature's richest treasurehouses. We knew where to get oil, we had learned how to refine it, and we had the people of the world as customers. It had taken long years to build the coal industry, centuries to forge that in iron and steel, yet with oil, an industry with a future second to none was born almost overnight.

CIVIL WAR FINANCE

Jay Cooke, Bond Drives, and Greenbacks

THREE main developments characterized the record of federal finance during the Civil War. Each was to have an important bearing on the country's business for years to come. First, Congress took the ill-fated step of causing the Treasury to issue legal tender notes, later known as greenbacks, which set off a spiral of inflation. Next, the government embarked upon a program of heavy borrowing from our people through the agency of national war bond drives. Finally the National Bank Act was passed in 1863, establishing for the first time a uniform, comprehensive, national paper currency. Each of these projects developed from the necessities of war. Their direct consequences affected every phase of our economic life.

The principal financial burden of government through the Civil War was carried by Salmon P. Chase, Secretary of the Treasury from March, 1861, to July, 1864. He had been a power in Ohio politics and his appointment was regarded as political recognition of that important area of Republicanism. He had little or no financial experience. As a nation we seem to go about these things in an Alice-Through-the-Looking-Glass manner. On the same basis during World War II an amateur agriculturist was placed in charge, not of the Department of Agriculture, but of the Treasury.

When Chase assumed his responsibilities in Lincoln's cabinet, his life was destined to be full of a number of things. After war broke out, he faced mounting expenses, a bare cupboard, and government credit in poor condition. When sorely in need of funds in May, 1861, Chase was able to sell barely \$7,310,000 of an offering of \$9,000,000 six per cent bonds, and these only at a heavy discount, at prices ranging from 85 to 93. Not a very stimulating experience for the man who was expected to pay the whole war bill, already assuming proportions in the hundreds of millions.

In undertaking this role of a financial Atlas, Chase was not to find himself deserted in his hour of need. There was one who was not only willing to assist him but who had few inhibitions about pressing his aid upon the new Secretary. This was Jay Cooke, Philadelphia banker, a man of keen mind, broad financial experience, and an aggressive temperament. Prior to the war he had advanced money to his brother, Henry Cooke, who ran a small newspaper in Ohio which had given important political support to Chase. In doing this, he may not have been entirely unmindful of favorable eventualities. When Chase assumed office, we find Jay writing to Brother Henry as follows under date of March 1, 1861: "I see Chase is in the Treasury and now what is to be done? Can't you sell out the paper and open a banking house in Washington and be something respectable?"¹

The pressure of war expenses forced Congress by August of 1861 to take some moderate steps in authorizing emergency financial measures and in providing new tax revenues. It was up to Chase, of course, to raise the needed money. As later in World War II, the fattest looking turkeys were the big banks. Accordingly, Chase, Jay Cooke, and John J. Cisco, Assistant Treasurer in New York City, went a-gunning with the members of the New York Chamber of Commerce as beaters. The result was that a syndicate of New York, Boston, and Philadelphia banks agreed to advance the Treasury \$50 million at once with the possibility of taking two more installments for a total of \$150 million. The burden was distributed in ratio to banking capital, amounting to 70 per cent for New York, 20 per cent for Boston, and 10 per cent for Philadelphia.

These advances were to be repaid from the public sale of a particular issue of notes, of a class which was to become one of the principal instruments of war finance. These were the "three-year seven-thirties." That is, they were payable in three years with interest at the rate of 7.3 per cent per annum. It is said that Chase arrived at this odd figure by allowing for interest on a \$100 bond at the rate of 2¢ per day for 365 days. A characteristic of the investment market during those years was that these three-year notes carried a higher income return than long-term bonds.

Jay Cooke was promptly appointed a Treasury agent for selling "seven-thirties." A selling commission of $\frac{1}{8}$ to $\frac{1}{4}$ of 1 per cent was allowed him. At this point Cooke began to show his particular genius. He was a bond salesman without peer. With only a small allowance for advertising, he was able to secure widespread support from the press. Brother Henry traveled and pulled the doorbells of country banks. For those days, it was a program of aggressive and successful salesmanship. It impressed Chase and struck the public imagination.

While this selling campaign was going on, Secretary Chase and the

leading banks were getting into each other's hair. Chase, in what some considered a too-literal interpretation of his powers, took the position that the Treasury could sell its notes or bonds only against payment of actual coin. At the same time he was paying government creditors with demand notes which circulated generally. Banks were caught in a tide rip. They began to lose coin and collect paper. This condition was further aggravated by public lack of confidence. The timid commenced to hoard specie. By January of 1862 the banks of the North possessed only \$87 million of specie to support liabilities of \$459 million.²

In order to relieve this situation, bank men suggested a procedure somewhat analogous to the one we have since come to follow. Instead of transferring specie to pay for bonds, they proposed that the deposits arising from government borrowings be allowed to stay with the banks until actually used. The Treasury could then draw checks upon these balances, such checks to be paid by the bank in its own notes. This practice, the bank men claimed, would preserve the integrity of their specie reserves. But Chase stuck to his guns and insisted upon coin on the barrel-head. Faced with this loss of specie to the Treasury and apprehensive of public hoarding, the New York banks on December 30, 1861, took the lead in suspending specie payments. All banks and the government itself speedily followed suit. The Treasury, however, continued to pay in gold the interest on its bond obligations.

The simplest problems of wartime finance are difficult enough but during 1861 and 1862 the situation was rendered infinitely complex by the political confusion which prevailed. The usual "short-war" hope dominated people's minds. Congress could not summon the courage to levy taxes commensurate with the extraordinary expenditure of funds. This fact deterred people from buying government bonds. Expenses were mounting as a great army was mobilized and equipped. Confronted with inadequate tax receipts, Congress simply had to find something to use for money. Soldiers must be paid, clothed, and fed.

The statesmen on Capitol Hill followed the line of least resistance. Having given Chase authority to issue a small quantity of demand notes in 1861 in order to pay government bills, Congress went completely overboard in February, 1862. It authorized the issuance of legal-tender notes, "greenbacks." This paper bore no interest and carried no pledge as to time of redemption. It was declared legal tender for all debts except customs dues and interest on government bonds. The step was a crucial one. The curtain had gone up on that serious concomitant of warfare—inflation of the currency and rising prices. For a time these new notes were convertible into six per cent bonds, the interest and principal of which were

payable in gold. But in the end all semblance of specie support or definite redemption was withdrawn.

Before the tap was turned off in 1864, the Treasury had pumped more than \$430 million of legal tenders into our monetary supply. As measured in gold, these notes promptly depreciated. In February of 1862 the paper dollar was worth only 98¢, gradually sagging to reach a low of 39¢ in August, 1864. Consequently prices rose so that from a base of 100 in 1860, they had spiraled upward to 216.8 in 1865. "The total effect of paper issues in increasing the cost of the war has been estimated at between \$528 million and \$600 million; even this large amount is small when compared with the burdens which inflated prices placed upon the whole people in the ordinary relations of trade and industry."³

After the suspension of specie payments and the first issue of greenbacks, confusion reigned in official minds. There was none, however, in Jay Cooke's. He was determined to turn his relationship with Chase into a paying business. Accordingly he opened a banking house in Washington, placing Brother Henry and Harris C. Fahnestock, a Harrisburg banker, in immediate command, subject to Cooke's careful supervision from Philadelphia. Henry Cooke dashed in and out of Chase's sanctum as though it were simply another department of the banking house. Jay, the Magnificent, lavished hospitality upon Chase and his family.

On the other hand, it must be admitted that Cooke was making good. His confidence, resourcefulness, and knowledge of investment banking gave Chase a real prop in his time of trial. Cooke's aggressive methods and early success in selling the seven-thirties were extraordinarily stimulating to a man engulfed in money demands. In spite of all this, one questions whether Jay Cooke was quite prepared for the full flowering of their friendship which occurred about this time. On February 7th the Secretary of the Treasury wrote: ⁴

MY DEAR COOKE:

I congratulate you on the rise of your seven thirties. And now I want to be a borrower myself. Will you lend me \$2000 in the shape of your draft on New York? If so please send it to me immediately. I want it to pay on account of a store I am rebuilding on Katie's property in Cincinnati.

Your friend,

S. P. CHASE

Harvest time for Jay Cooke came in 1862-1863. Chase had long wanted to avoid reliance on the banks for Treasury financing. Accordingly in October, 1862, he offered Jay Cooke, as an individual, a general agency for a country-wide sale of the "five-twenties"—i.e., 6 per cent twenty-year

bonds, noncallable for five years. What he had in mind was a war bond drive such as those with which we are familiar today. In 1862 this was financial pioneering. Cooke's job was to sell these bonds in small lots to the butcher, the baker, and the candlestick maker. As general agent of the Treasury, Jay Cooke gradually built an organization of some 2500 sub-agents in all parts of the North. Their selling efforts were supported by a publicity campaign in the newspapers such as the nation had never seen. Paid advertisements at small cost were used to stimulate publication of news items which painted a glowing picture of the five-twenties as an investment. Unlike our present-day policy of selling government bonds without commissions, Cooke received at first $\frac{1}{2}$ and then $\frac{3}{4}$ of 1 per cent on all sales through his far-flung organization. Part of this, of course, was reallocated to subagents.

In the meanwhile other events were transpiring to contribute to the success of Chase's war loan drive. Public confidence in military victory was growing. Congress had begun to levy taxes in realistic amounts. Our people were almost avid for increased taxation in their keen desire to bring the war to an end. For the first time a federal income tax was levied. If one were in the high brackets, with an income of over \$5,000 a year, the rate was 10 per cent.

Also influencing the sale of bonds was the rising price of gold, as the Treasury continued to pump greenbacks into circulation. Interest on the "five-twenties" was payable in gold. We find Cooke advertising "At the present premium on gold these bonds yield about eight per cent per annum."⁵ Almost anyone will admit that was a pretty attractive bit of merchandise to sell.

Sales poured in during 1863. Conditions at that time might be described as a bond salesman's Heaven. The principal difficulty was that the Treasury could not engrave bonds fast enough to keep up with the sales! By January, 1864, the whole issue of \$500 million had been marketed and these bonds were selling at a premium on the open market. Jay Cooke had become the most publicized private citizen of the North.

Stemming from the pressure to provide funds for the expenses of war was another event of lasting and constructive importance. This was passage of the National Banking Act in February, 1863, and its comprehensive amendment in 1864. A notable development for American business. For many years Chase had been convinced that the prevailing system of local bank-note circulation left much to be desired. The exigencies of wartime finance gave him his opportunity. He proposed a national currency secured by government bonds. Taking large amounts of bonds out

of the floating supply would greatly improve and stabilize the public market. One hand washed the other most effectively.

That Chase and others should be concerned about the old currency system of notes issued by state banks is not to be wondered at. Consider for a moment the conditions which prevailed before the adoption of the National Banking Act. Final payment for goods and services was usually made with bank bills or notes. These were issued by some 1496 different banks, incorporated under the laws of twenty-nine separate states. "In some states the bill-holder was secured by the daily redemption of notes in the principal city; in others by the pledge of State stocks; and in others by coin reserves. There were State banks with branches, independent banks, free banks, banks organized under a general law, and banks with special charters."⁶

A concern doing a national business might be paid in any one of 7000 different kinds of notes. Of these, "over 3000 varieties of altered notes were afloat, 1700 varieties of spurious notes, and over 800 varieties of imitations, making more than 5500 varieties of fraudulent notes, . . ." ⁷ The exchange rates between various cities and banks were frequently wide and highly erratic. It was not unusual to find a 10 per cent differential. All of this, of course, was a burden on business and greatly increased the cost of transactions.

Accordingly in 1863 Lincoln approved the National Banking Act. In essence it provided that a bank could deposit federal bonds with the Treasurer of the United States and receive 90 per cent of their market value in uniform circulating notes. Such notes were receivable for all government dues except customs. As amended in 1864 it was provided that banks must arrange to redeem circulation in leading cities. Also, under certain restrictions, the Secretary of the Treasury might use selected banks as depositories of U. S. funds.

Acceptance of the new system was slow at first, but when in 1865 a 10 per cent tax was authorized on state bank issues, the change-over was made effective. The use of local bank notes ceased entirely. In spite of all its faults, the old system had performed yeoman service. From the time of Hamilton to the Civil War, as the country was growing in separate communities, bank notes had constituted the principal medium of exchange. Once the individual states developed into one integral business community through improved systems of communication, the local bank note became obsolete. We were doing business as a nation. We needed a medium of exchange in keeping with our new stature. This we secured through the new national bank notes.

Up to this point we have limited our attention to conditions in the

North. How were our southern cousins doing? The answer is, they were having a devil of a time. They employed the usual methods of war financing as did the North—taxes, loans, and paper money. The great difference was that in the South taxes and loans yielded practically nothing. The Confederates, therefore, were left with only one paying device—printing-press money.

The blockade started their financial problems. The Confederacy had counted upon shipments of cotton to Europe to provide foreign exchange and had expected that duties levied on imports would yield domestic revenue. When northern ships closed in on principal southern ports, these hopes vanished like a mirage. Goods were bought and soldiers paid with fiat currency. Inflation ran riot. As early as 1862 it took twenty-two Confederate paper dollars to buy the goods which one gold dollar would purchase. In Richmond a dinner for one person at the best hotel cost nearly \$100 in currency. At the end of the war it was estimated that the Confederacy had emitted over one billion dollars face value of paper in various forms and received in specie not over \$30 million.

In its desperate struggle to carry on the war, the Confederacy tried two rather novel devices in the realm of finance. An internal \$100 million "Produce Loan" was launched. The theory of this was that a planter would subscribe for twenty-year 8 per cent bonds and make payment in bales of cotton. Then the government, being in possession of a large amount of cotton, would be in a position to negotiate directly with England. The blockade denied consummation to this plan.

With the thought of thwarting the Yankee stranglehold, a second scheme was attempted in London and Paris. This attained considerable notoriety in European financial circles. The international banker, Emile Erlanger of Paris and London, brought out an issue of \$15 million Confederate States 8 per cent bonds, known thereafter as the Erlanger loan. These were offered simultaneously in London, Liverpool, Paris, Amsterdam, and Frankfort.

A tempting bait was offered. A bond holder had an option on Confederate cotton in New Orleans at sixpence per pound, which might be exercised either by blockade running or by normal sale after the peace. With cotton selling in Liverpool at two shillings, this attracted many speculators. After the initial enthusiasm, however, purchasing interest disappeared slowly. Sales trickled along for many months. The market price continued to drop in spite of valiant efforts by Confederate Agent Mason to sustain it. Finally it became obvious that the loan was a failure. The South had shot its last round on the battlefield of finance and had lost.

We recall the forecast by southern statesmen, before the outbreak of

hostilities, that the denial of cotton to England would bring that great nation to her knees. Instead the South itself was wrecked by the northern blockade. Once our ships took station off Charleston, Savannah, and New Orleans, we had a strangle hold around the neck of the Confederacy. The importance of this is often forgotten as tales of bloody battles are told.

Again, as in the Revolution and the War of 1812, the merchant marine scored heavily. Hastily armed ships of commerce were used by the Navy to make its blockade effective. Sea power was once more to prove its basic control. In a manner of speaking, the success of the North was fore-ordained and the doom of the Confederacy sealed in those early years of the new nation when the traders of the North went down to the sea in ships.

XXI.

THE INCREDIBLE ERA

*Preview 1865-1900;
The Atlantic Cable*

A YOUNG soldier returning in 1865 from Grant's slugging campaigns or from Lee's disastrous last stand would have had moderately good prospects of living to the end of the century. Had his life span been thus ordered, he would have witnessed in those thirty-five years business and economic developments of spectacular proportions. He would have observed a rapidly changing scene of continued land settlement, mounting immigration, expansive railroad building, and extraordinary advances in applied science. He would have lived through periods of high prosperity and somber depression. He would have been present at the birth of a new age for the business world.

The fundamental elements directing this course of events were simple though powerful and far-reaching. Through the Homestead Act of 1862 and aggressive sales campaigns by the railroads of their land-grant holdings, we offered rich farms to all who had the will to work. The doors of our ports were kept wide open for immigration. At the same time we built thousands of miles of railroads to provide transportation for the newly settled areas. These were the basic ingredients for the great growth and prosperity of the Rigorous Seventies, the Riotous Eighties, and the Gay Nineties—cheap land, free entry, and a far-flung railroad system.

But this was only the start. Huge mineral riches were acquired as the Oil Regions, Lake Superior areas, Rocky Mountains, and Sierra Nevada yielded up their treasures in oil, copper, iron, gold, and silver. Applied science brought about an industrial revolution when that modern miracle-material, steel, was made available in sizable quantities. Mechanization of industry proceeded apace to yield a constantly accelerating volume of production.

In spite of the rapidly increasing demand for goods and services, competition coursed like wildfire in all fields of business. In the years imme-

diately following the war, units of industrial operation were small. A little capital would get a man into business on his own in almost any industry. It was still an era of the small businessman. But while it was easy to draw cards, it became increasingly difficult to win stakes. There were too many players. Quite naturally, then, men sought relief from cut-throat competition. Resort was had to combination and consolidation. Competition was not only frequently brought under control but at times completely stifled. The Age of Big Business and Trusts was launched.

As part of this development, the Civil War veteran was to see the evolution of the great monarchs of modern business. He would watch as a silent, clear thinking, persevering produce merchant, John D. Rockefeller, became the czar of the oil industry. A few years later, he would be thrilled with the Horatio Alger story of the poverty-stricken Pittsburgh messenger boy, Andrew Carnegie, who, knowing nothing of steel, became the world's greatest steelmaker.

As the period progressed, our veteran was to sweat out two major panics and several minor ones. For the whole thirty-five years, he was to be bedeviled by the nation's currency problem. He would detest the two-kinds-of-money system which prevailed until gold payments were resumed in 1879. Then in the eighties and nineties, he would become bewildered as the great war was fought between gold money and silver money, with conservative business on one side and mining and agricultural interests on the other.

From a distance he was to observe sensational stockmarket buccaneering as men like Drew, Gould, and Fisk fought to control, and occasionally scuttle, our new railroad properties. He would note with satisfaction that others—Vanderbilt, Hill, and Harriman—sought to build as well as dominate.

Most far-reaching in its implications were the fantastic developments of applied science—Bell with his telephone in the seventies; Brush, Edison, Thomson, Houston, with electric lighting. Then came the application of electricity as power when the ultramicroscopic electron was harnessed to factory wheels and transportation vehicles. Finally in a blaze of accomplishment there came at the end of the century the internal combustion engine, the automobile, and wireless telegraphy. It was in truth an incredible era.

But as the clamor of Civil War ceased and the slogging foot soldier turned heavy footsteps homeward, the national scene presented a striking contrast. The North was enjoying a war boom and its citizens were prosperous. Their cities and homes were intact. Their railroads were in excel-

lent condition. Their farms yielded an abundance which overflowed into Europe. While prices were high, money seemed easy to come by. People had plenty of food, clothing, and luxuries. The future was bright with promise.

The South, on the contrary, was a land of devastation. Its economy had been garrotted. Confederate bonds and currency were worthless. Cities and plantations had been seared by the actual flame of battle. Railroads had been torn up and rolling stock destroyed. The people, starved by the constricting blockade of the war years, had little food, less clothing, and no money. They had suffered the numbing bitterness of defeat. The present was so laden with tragedy that hope itself had almost become extinct.

These were the prevailing conditions under which the returned soldier again took up the affairs of business or of agriculture. The one who put away a blue uniform had every cause to look forward with confidence. His cousin who wearily removed a ragged gray blouse faced a grim future. He must rebuild his world from scratch.

As the currents of a peace economy once again took control of a united nation, advances in communications gave life and impetus to all business. It is an axiom that the commercial progress of any period is always accelerated by the improvements in its communications. In this respect, the thirty-five years following the Civil War were outstanding. The Atlantic cable in 1866 placed the merchants of Chicago and New York only a few minutes, rather than weeks, apart from their compeers in London and Amsterdam. The Pacific railroads brought the great plains, the Rocky Mountains, and the Pacific Coast within a few days' shipping time for manufacturers in the East. The fantastic new writing machine, called by some a "typewriter," was to speed up and systematize correspondence. Bell's "impractical mechanical toy" was to accelerate business turnover and to bring the packing barons of Chicago in verbal contact with large customers in the East.

Cyrus W. Field's triumph in laying the Atlantic cable was an accomplishment of which businessmen should be proud. His record was one of indomitable faith, transcendent energy, and commercial integrity. Fate accorded him a series of disasters which might well have broken the spirit of a dozen men. Bitter as these disappointments were, they only served to harden the steel of his purpose.

Field made an auspicious start for ultimate success in business by serving as an errand boy for the dry-goods firm of A. T. Stewart & Company in New York, receiving for his first year's work a grand total of \$50. By the time he was thirty-three, he had survived one business failure as a

FIRST EDITION.

Two O'Clock.

THE OCEAN TELEGRAPH.

QUEEN VICTORIA'S MESSAGE.

PRESIDENT BUCHANAN'S REPLY.

THE NEWS IN THE CITY.

CELEBRATIONS ELSEWHERE.

THE FIRST MESSAGE THROUGH.

To the Directors of the Atlantic Telegraph Company, New York:

Europe and America are united by telegraph. Glory to God in the highest; on earth peace, good will toward men.

(Signed) DIRECTORS ATLANTIC TELEGRAPH COMPANY, GREAT BRITAIN.

Her Majesty desires to congratulate the President upon the successful completion of this great international work, in which the Queen has taken the deepest interest.

A MESSAGE FROM THE SUPERINTENDENT OF THE NEWFOUNDLAND LINE.

TRINITY BAY, August 16, 7 P. M.—The message to the President, purporting to be from the Queen, actually came over the Atlantic cable from Valentia, Ireland, and is unquestionably authentic. The President's reply will be sent as soon as received.

A. MACKAY, Superintendent.

THE PRESIDENT'S REPLY.

WASHINGTON CITY, August 16, 1859.

To Her Majesty Victoria, Queen of Great Britain:

The President cordially reciprocates the congratulations of her Majesty the Queen on the success of the great international enterprise, accomplished by the science, skill and indomitable energy of the two countries. It is a triumph more glorious because far more useful to mankind than was ever won by conqueror on the field of battle. May the Atlantic Telegraph, under the blessing of Heaven, prove to be a bond of perpetual peace and friendship between the kindred nations, and an instrument destined by Divine Providence to diffuse religion, civilization, liberty and law throughout the world. In this view, will

partner in a small firm, had acquired a fortune of some \$200,000, and had retired to take his leisure.

At this point he encountered a Canadian engineer who had been promoting a telegraph line across Newfoundland. Field's imagination immediately jumped across space like an electric spark. An Atlantic cable became the obsession of his life.

Together with prominent businessmen of New York, such as Peter Cooper, Wilson G. Hunt, Moses Taylor, Marshall O. Roberts, and Chandler White, he organized the New York, Newfoundland & London Telegraph Company. The idea had great imaginative appeal, and people had confidence in Field. A capital of \$1,500,000 was subscribed. Then in London he laid siege to conservative English capitalists. Even here Field's enthusiasm and obvious integrity won friends of wealth and influence. The Atlantic Telegraph Company was organized in London with a capital of £350,000.

For ten years, 1856-1866, Cyrus Field fought the good fight and held true to his faith. In 1857 on the first attempt to lay the cable, it broke after almost 400 miles had been put down. Again in 1858 there occurred another break. However, success seemed attained later that year when the cable was put through from Valentia in Ireland to Trinity Bay in Newfoundland. After a few messages were sent, the cable went mysteriously dead. Again, heartbreaking failure!

For the next two years and during the war, further attempts were held up. Yet Field had never a dull moment. The merchant firm bearing his name, and supported by some of his capital, suspended both in the panic of 1857 and in the war disturbance of 1860. Upon Field's shoulders fell the responsibility of settling with creditors.

Then in July, 1865, we find him aboard the famous English steamer, *Great Eastern*, making another attempt to lay the cable from Valentia. When about halfway across, ill fate struck once again. This cable broke and could not be recovered. Nothing daunted, Field returned to London in December, 1865. By this time he was a tradition. The English recognized a kindred spirit. Here was another manifestation of that grand old Anglo-Saxon, never-say-die spirit.

Assisted by several of his former backers, a new company was organized—the Anglo-American Telegraph Company. The esteem with which Field was still regarded is evidenced by the fact that in spite of the many failures in laying the cable, the shares of this company were successfully sold to the public through the firm of J. S. Morgan & Co. in London.

At long last, on July 27, 1866, the laying of the Atlantic cable was completed. Messages began to flow between Europe and America almost

instantaneously. Field and his associates were the heroes of two continents. The world was at his feet. Moreover he had a large profit in the cable shares which he had purchased. One of his first acts on returning to America was to pay off the creditors of Cyrus W. Field & Co. in full with interest at 7 per cent.

During these years when diplomatic relations with England were strained, Field was an effective ambassador of good will. His success in getting leading businessmen of both countries to work in cooperation did much to break down mutual distrust. The doing of business between nations has always rendered the affairs of politics more prosperous. He won many friends in those trying years. Gladstone, the Duke of Argyll, John Bright, Michael Faraday, Thackeray, Lady Byron, Sir Charles Bright, Thomas Brassey, all paid deep respect to this fighting Yankee and the cause to which he had dedicated himself.

Later upon an anniversary of the first cable, Sir James Alexander sent this message to Field: "Distance has no longer anything to do with commerce. The foreign trade of all civilized nations is now becoming only an extended home trade; all the old ways of commerce are changed or changing, creating amongst all nations a common interest in the welfare of each other!"¹

XXII.

A PACIFIC RAILROAD

Judah, Prophet in the Wilderness

WITHIN three years after Field had finally succeeded with his Atlantic cable, the spotlight of national interest was turned inland to focus on a barren, sagebrush upland in what was later to be the State of Utah. Here at Promontory, on May 10th, 1869, Leland Stanford, surrounded by dignitaries from all over the nation, drove the last spike in the tracks connecting the newly laid Central Pacific Railroad with the equally new Union Pacific, thus making one through route from Omaha, Nebraska, to Sacramento, California. At long last our national ambition was gratified—the country had a Pacific railroad. The bastion of the Rocky Mountains was breached and California was effectively tied to the Union.

The formal ceremony marking the completion of this undertaking was a fitting climax to the spectacular events which had characterized the project from the start. Each stage of the long story had been colorful—rivalry between North and South for location of the route; a strenuous construction race; riotous railhead working camps—Hell on Wheels; Chinese coolie labor; and attacks by the Indians. Even after the railroads were completed and in operation the drama continued. A national scandal broke out over the Union Pacific. There had been high finance and wrongdoing in high places. Builders of the Central Pacific made huge fortunes and acquired an economic empire in California. The achievement of a Pacific railroad cut a swath through American life—social, economic, and political.

While the completion of this project was a goal sought with intense national feeling, there was no stampede of private capital to undertake it. Hard-headed businessmen could see no dividends from huge investments in long stretches of track over vast plains inhabited only by Indians and thundering herds of buffalo. Furthermore, engineers feared the con-

struction problems involved in crossing the Rocky Mountains. There was just too much of the unknown about the whole affair. It became apparent that unless government financial aid was in some way secured the Pacific railroad would not be built.

While there had been much talk and many projects, to the zestful pioneers of California must go the honor of taking the first practical steps. Modest plans for the organization of the Central Pacific Railroad were consummated. Credit for this was due largely to the spirit of one man and his flaming faith in an idea—Theodore D. Judah. Ordinarily a thoroughly practical and commonsense young railroad man, he became, when his mind got on the subject of a Pacific railroad, an irresistible force and, to some, an irrepressible bore.

Judah had been called from the East to California for the purpose of building a short stretch of railroad from Sacramento to the placer diggings. After finishing this work, he began promotion of the idea which obsessed him. Recognizing that the vastness of a project for a Pacific railroad was frightening to men of capital, he reined in his imagination to what he thought was a slow walk and proposed in the first instance only to build a railroad eastward to the state border. He needed a subscribed capital of \$115,000. To procure this he laid siege to the gold barons of San Francisco. These men, with a tradition of about ten years in handling capital, turned him down cold. "Crazy Judah" was entirely too wild for these conservative Forty-Niners!

Back to Sacramento went Judah undismayed by his rebuff. Here he succeeded in rounding up twelve adherents. One night in a little room over a hardware store this group held a meeting that was to start an important chain of events. These men were simply smalltown merchants such as might have been found in scores of other American rural centers. They had built up little stores of capital first by selling supplies to the placer gold miners of California and more recently by sending merchandise eastward over the escarpment of the Sierras to the new El Dorado, the mining camp of Virginia City.

At this meeting Judah showed himself as much of a psychologist as he was a promoter. Instead of urging the idea of a transcontinental railroad, he submerged that thought in a picture of the profits which would accrue to these California businessmen if Virginia City and its lucrative trade could be tied to Sacramento by quick rail transportation. They understood that language and took steps to start the project. The Central Pacific Railroad was launched. On it four of these pioneer traders would ride to great riches and exalted economic power by reason of the support they gave to "Crazy Judah" and his "Dutch Flat Swindle." They were Collis P. Hunting-

ton, Leland Stanford, Mark Hopkins, and Charles Crocker. Within twenty years they became, through the vision of this prophet in the wilderness, emperors of an economic realm on the Pacific Coast. Judah, the prophet, was to pass away without fortune, largely unhonored and definitely unsung.

While the Central Pacific was started as a 115-mile line, its future was radically changed by the war. The irrepressible Judah went back East to Washington to lobby for government aid in financing—not the little line to Virginia City—but the great project to which he had dedicated himself, a Pacific railroad. This was in 1861 after the outbreak of hostilities. And Judah was as good a lobbyist as he was a promoter. But now he was playing a different tune from the one which had charmed those Sacramento businessmen. In the Halls of Congress the Pacific Railroad became a war measure. Only by such a tie could California be made secure for the Union. Confederate raiders were known to be on the high seas. No richer prizes could be imagined than lone ships from San Francisco heavily laden with gold and silver.

It is doubtful that any other lobbyist has ever had such a welcome by Congress. Judah was not only given an office in the Capitol building but was designated Secretary of the Senate Committee on the Pacific Railroad, Clerk of the Subcommittee in the House, and soon Clerk of the regular House Committee on Railroads.

On July 1, 1862, Judah's victory was won when President Lincoln signed the bill providing for federal aid both to the Union Pacific which was to build westward from Omaha and to the Central Pacific which was to build eastward from Sacramento. Promptly his message sped west over the recently strung wires of the Pacific Telegraph: "We have drawn the elephant. Now let us see if we can harness him up."¹

Construction was started on the Central Pacific at Sacramento in January, 1863, and in December of that year on the Union Pacific near Omaha. After a few months sponsors for both roads again appeared in Washington impelled by common impulse—their hearts beat as one. They asserted that unless government aid were increased, all would go up in smoke. Success crowned their efforts and under the Act of 1864 federal aid was made substantial. For every mile of construction each road was to receive twenty sections of adjoining land. In addition the Treasury loaned the companies United States Government thirty-year 6 per cent bonds at the rate of \$16,000, \$32,000, and \$48,000 per mile depending upon construction difficulties. Furthermore the companies were authorized to sell their own first mortgage bonds in similar amounts secured by a lien prior to that which

secured the Government for its advances in the shape of government bonds.

While this was extremely liberal assistance from Congress, it proved necessary in order to attract risk capital to carry on construction work and eventually to operate the roads. This was not easy. Men of means were still skeptical. Our experience with roads in the Midwest and South had shown clearly that great open spaces do not pay dividends. It looked as though it would take generations to settle the vast expanses of this new and somewhat forbidding country. Prospective contractors asked themselves what would be the value of the securities offered in payment. Would there be enough traffic even to pay interest on the first mortgage bonds? However the prospect of large profits should the projects succeed was sufficiently attractive to tempt a few persons into putting up the nucleus of capital needed to get construction started and the government subsidy into operation.

The arrangements by which the construction of these roads was undertaken were typical of the times. To us they are quite incredible. It was common practice for small, self-serving groups of directors of a new railroad to organize a contracting company and vote themselves a construction contract. Naturally the terms would be so arranged that the principals did not stand to lose. This procedure was followed by both the Central Pacific and Union Pacific.

In the case of the Union Pacific, the first such step was taken under the direction of Dr. Thomas C. Durant, its Vice President, when in the fall of 1864 a contract was let to an employee of the railroad, one Herbert M. Hoxie. The latter agreed to subscribe for one million dollars of stock in the railroad and contracted to construct 247 miles of track for which he was to be paid at the rate of \$50,000 a mile. A few days later the real principals were disclosed when Hoxie transferred this contract to a group of five partner-contractors, the first four of whom were directors of the railroad—Dr. Durant, Cornelius Bushnell, C. A. Lambard, H. S. McComb, and H. W. Gray.

This tight little mutual benefit society now became concerned about their personal liability under the contract. They decided to incorporate. Dr. Durant, the moving spirit, had secured control of a company with a Pennsylvania charter of unique flexibility—the Pennsylvania Fiscal Agency. Apparently they felt that such a name was not high sounding enough for the high finance which was planned. Even the English language seemed inadequate. The old corporation now appeared with a silk hat and a waxed moustache—the Credit Mobilier of America.

These promoters subscribed to the stock of Credit Mobilier in the

amount of \$1,600,000, a figure which was shortly increased to \$2,500,000. Then outstanding stock of Union Pacific was acquired by Credit Mobilier and distributed to its stockholders so that to a large degree stockholders of the two companies were identical. Credit Mobilier guaranteed the performance of the Hoxie contract and for this was entitled to receive all the payments which were to be made in cash or securities as the road-bed was graded and tracks laid. In the meantime work was going ahead rapidly as raucous construction gangs pushed their railhead tent-towns across the plains.

In order to reinforce the financial resources of the Credit Mobilier new blood was now brought in, some of which by no stretch of the imagination could be called anemic. Oakes Ames, Sidney Dillon, and Rowland G. Hazard became stockholders in both the Union Pacific and the Credit Mobilier. Astounding as it may seem to us, Oakes Ames, a Congressman from Massachusetts, was a member of the House Committee for the Pacific Railroad. Not content with playing a quiescent role in the company he immediately challenged the leadership of Dr. Durant and became the moving spirit in the negotiation of a new contract between the railroad and the Credit Mobilier. The capital of the latter was increased in 1866 to \$3,750,000. Apologists of the company maintained that at the time this was a difficult operation. Perhaps it was. In retrospect it would seem that the consideration offered to stockholders for putting up new capital was pretty tempting. For each \$2000 of stock owned in Credit Mobilier, stockholders were offered the right to subscribe to \$1000 in new stock of the Credit Mobilier plus \$1000 in Union Pacific first mortgage bonds, all for a payment of \$1,000 in cash. A few thought so little of this offer that they sold out completely.

In the summer of 1867, the principal construction contract was executed between the Union Pacific on one hand and Congressman Oakes Ames on the other. Two months later it was assigned to seven trustees who undertook to administer it for the benefit of the stockholders of the Credit Mobilier. Provision was made to construct 667 miles of railroad further westward at prices ranging from \$42,000 per mile up to \$96,000 per mile, an aggregate cost of about \$48,000,000. This contract was intended to be profitable. It exceeded all expectations largely because the actual work turned out to be less costly than had been anticipated. Much to everyone's surprise, no baffling construction difficulties were encountered. The Continental Divide was crossed on a gently sloping plateau. The principal problems were those involved in continually moving large forces of labor and material to keep pace with the rapid construction rate. At one time

nearly 8000 men were employed and 10,000 animals in use. Over favorable territory the road was advanced as much as seven miles per day.

In the meantime the Central Pacific, in spite of extraordinary difficulties, was forging its line eastward to meet the Union Pacific. Unfortunately, Judah, the practical railroad builder, had resigned at an early period, having differed violently with the Sacramento merchants over their attempts to realize huge construction profits. One serious problem was the matter of surmounting the sharp western slope of the Sierra Nevada. Another which beset them constantly was an inadequate supply of labor. The contractors building the Central Pacific did not have the sources of manpower to draw upon that were available on the other side of the Rocky Mountains. In desperation they tried Chinese coolies who were to be found reworking old placer diggings or raising garden vegetables. The result was astonishing. The monosyllabic little yellow men, weighing not over 120 pounds, could keep well abreast of the brawny laborers of Celtic and Anglo-Saxon lineage.

After the Central Pacific had surmounted the Sierras, the construction race with the Union Pacific was on in earnest. Each was striving to collect the utmost in government subsidy which, of course, was allotted on the basis of miles completed. Survey parties were sent far in advance of practical necessities in order to bluff the other road into believing that work was going on at a terrific pace. As the two railheads drew near their advance gangs worked in close proximity and the rivalry at times became somewhat keen. The laborers of the Union Pacific were mostly burly, hard-drinking, two-fisted Irishmen. Their contempt for the little Chinese of the Central Pacific was boundless. In the give and take of this rough-and-tumble competition there would be occasions when big boulders would come tumbling mysteriously down mountainsides upon congested gangs of Irish workmen. Muttering sulphurous oaths, the Irish would scatter madly. At other times, charges of dynamite would be secretly implanted in the embankments on which the placid, unsuspecting Orientals were laboring. Suddenly the earth would shudder and the sky would be filled with ballast, boulders, wheelbarrows, and blue-clad "China boys" doing slow-motion cartwheels in mid-air. Good clean fun—until the Chinese replied in kind and tried it on the Irish.

When both railroads were completed in 1869, and a through route to the Pacific was in operation, the results surprised even the long-faithful believers in the project. A large volume of both freight and passenger business built up rapidly. There was no overland competition and rates were maintained on a high level. Net earnings went from \$2,031,000 in 1869 to \$3,921,000 in 1871 and to \$6,451,000 in 1875.² Population along

the route grew apace; that of Utah doubled and that of Nebraska increased almost fourfold in the ten years from 1870 to 1880. The Pacific railroad was making a great contribution to the growth of the nation.

While moneyed groups in the East had been cold to the promotion of the Union Pacific, once its success was established there were many willing to share it. Various eastern railroads and capitalists began a scramble for control of Union Pacific. In 1871 Pennsylvania Railroad interests were dominant and the redoubtable Thomas A. Scott became President of the Union Pacific. Then in 1872 Horace A. Clark of the Lake Shore and Michigan Southern secured control and served as President until succeeded by Sidney Dillon. Later that arch-speculator and market manipulator, Jay Gould, acquired enough stock to put him in undisputed command. He placed the stock on an \$8 dividend basis and later sold most of his 200,000 shares at a large profit.

Such changes of management were bad for the operation of the road. There were some other developments, however, which were worse. These were the scandals which subsequently broke out over the large profits amassed by the stockholders of Credit Mobilier and the relationship between the company and certain high-placed federal officials. As to the legitimacy of the high profits, there were two schools of thought. An investigating committee of Congress believed them inordinate. Others pointed out that when the project was undertaken there was much uncertainty about the possibility of completing a through railroad and if completed whether it would pay. Undoubtedly the profits were very large but it is to be remembered that the nation was then going through a particularly expansive era of growth when success in any project spelled liberal reward. The record of federal public officials in connection with the Union Pacific and Credit Mobilier caused more concern than the question of high profits. The story revolves around the central figure of Oakes Ames, the Massachusetts Congressman. He came from one of America's oldest manufacturing families. John Ames, the grandfather, had started the Ames Works, making guns and shovels for our army during the Revolution. After Oakes and his brother inherited control in 1844, they were carried away with great expectations about the California gold rush and made heavy shipments of shovels to the forty-niners. Thus they first acquired an interest in the opening of the Far West. In this concrete manner it had been brought home to Oakes Ames that the settling of the new western country meant an expanding market for eastern manufacturers and a dynamic economy for the nation as a whole. He saw these developments contingent upon the construction of a Pacific railroad.

Unfortunately his enthusiasm ran away with his judgment. In the con-

gressional investigations of 1872-73 it was shown that Oakes Ames had secretly sold Credit Mobilier stock to members of Congress and other high federal officials upon an unusually attractive basis. He had placed it with those who were in a position to foster the relationship between government on the one hand and Credit Mobilier on the other. In explaining this he is said to have remarked: "I have found there is no difficulty in inducing men to look after their own property."³ As a result of the investigation, scandal developed which for some years was to shake the seats of the mighty in Washington. There was undoubtedly wrongdoing in high places. Several members of Congress and a Vice President were implicated.

In spite of these unfortunate developments, the public at large rejoiced in the achievement of a completed railroad to the Pacific Coast. This met with the same national acclaim that had been accorded the Erie Canal some forty-odd years before. New and exciting frontiers had been opened to enable the "course of Empire" to continue its westward way.

XXIII.

RAILROADS OPEN THE PRAIRIES

Chicago, Midwest Metropolis

OUR first Pacific railroad was the most striking event in railroad construction in the years following the Civil War. Yet it was not an isolated adventure. The nation was breaking out in a fever of railroad building. Within eight years after the cessation of hostilities we added more mileage than the country had possessed in 1860. Expansion continued beyond the turn of the century. The 30,000 miles of track of 1860 had become over 90,000 by 1880 and almost 200,000 in 1900. Not only were we adding more track but great strides were being made in improving equipment and efficiency of operation. Discovery of the Bessemer steel process was of basic importance because it made possible the elimination of iron rails, wooden bridges, and bulky castiron parts for locomotives and cars. George Westinghouse perfected his air brake which permitted the use of larger cars and longer trains. At the same time men were learning something of railroad management. As a result of these factors freight charges were reduced from an average of about 2¢ per ton mile in 1870 to .729¢ in 1900. What all this meant to the process of providing more goods for more people may be measured by the expanding volume of freight handled by the railroads. In 1882 they carried some 360,490,000 tons; by 1900 this figure had risen to almost 1,072,000,000.

Significant also was the fact that the major part of new railroad building occurred west of the Mississippi. Like rivulets of a spring freshet, small branches of the railroad system quickly found their way into almost every productive area. In 1860 railroad mileage west of the great river was something under 2000 miles. By 1890 it had grown to around 75,000. Expansion was particularly marked in the grain states from the Canadian border down through Kansas.

Ranking high among the railroad achievements of these years was the

construction of the Great Northern by James J. Hill. Having settled in the frontier town of St. Paul in the 1850's, Hill was soon acting as a shipping agent for the principal freight route to the outside world—river traffic down the Mississippi to St. Louis. By 1865, growing with the Twin Cities, he had acquired a small transportation business of his own, sending horse-drawn wagons on the overland trip from St. Paul to the Red River, whence flat boats carried his cargoes down to Winnipeg. He soon became convinced that this Red River Valley offered great prospects for development. From freight wagons to freight trains was a natural transition.

The panic of 1873 made possible Hill's start as a railroad magnate. When Jay Cooke and his Northern Pacific failed in that year, a subsidiary, the St. Paul & Pacific, also collapsed. This road had an ill-chosen group of rights of way through the State of Minnesota. Inspired by his faith in the future of the Red River country, Hill was seized with the idea of utilizing this line as the nucleus of a system to foster the expansion of the Northwest. If successful, the road might eventually be extended to the Pacific Coast. He decided that the first step in this program would be to buy the St. Paul & Pacific. Thus do depressions create opportunity for men of courage.

There was little isolationism in the West of that day. The principal financing of the St. Paul & Pacific had been done by Dutch bankers of Amsterdam. Likewise when Hill sought to raise capital for his plan of purchase, he turned to Canada and England. His partner in the freight business, Norman W. Kittson, was an agent of the Hudson's Bay Company. Through him Hill enlisted the assistance of Donald A. Smith (later Lord Strathcona), Chief Commissioner of the Hudson's Bay Company in the Northwest, who hoped to enlarge the growing trade between Canada and the United States through this Red River artery. Then George Stephen (later Lord Mountstephen), President of the Bank of Montreal, became a partner.

This group led by Hill bought out the Dutch interests giving bonds and preferred stock in a new company. Hill and Kittson personally assumed the obligation to pay interest on the bonds as well as to provide the company with more capital. They staked everything they had and were regarded in St. Paul as two good men gone wrong. Of this transaction Hill later remarked, "Altogether, I would estimate the cash liability incurred by us at between four and five million dollars."¹ From the outset they were successful in the operation of the property which, in 1879, became known as the St. Paul, Minneapolis, and Manitoba Railroad Company. The forty-four million dollar debt of the original company had been eliminated and the new company launched with a capitalization of sixteen million in bonds and fifteen million in stock.

This was an effective start for Hill. He threw the whole weight of his amazing energy and ability into building up his railroad. It made money from the start. In a short time he learned the essentials of sound railroad operation. But Hill was not content with his first conquest. He had a vision of a fabulous growth for his beloved Northwest. He would build a railroad system to foster that growth. Finally this would become a Pacific railroad.

It was a daring campaign. He was undertaking to parallel the Northern Pacific which lay to the south and the Canadian Pacific to the north, both of which had received heavy government aid. Hill had none. However, he was convinced that careful building for the long pull coupled with a conservative debt structure would mean low operating costs. With low costs he was confident of holding his own. Slowly but persistently he pushed his road across Dakota, then over the uplands of Montana, and finally to the coast. Profits from the operating portions of the system were used to push new lines westward. He was making the system build itself. But he was doing more than laying a line of track. He was also establishing credit. His insistence on sound construction and businesslike management won the admiration of bankers in New York and London. While other roads were being milked for dividends, Hill was carefully reinvesting in expansion. He was a businessman's railroad builder. He could see to far horizons, but he kept his feet firmly planted on the ground.

In January of 1893 the Great Northern was through to the coast. A more untoward time for opening a new line could not have been imagined. That year saw receiverships for a great part of our railroad system. In October Hill's chief competitor, the Northern Pacific, once again joined the growing list of bankrupts. But the Great Northern carried on to success. In 1895, Hill wrote: "Our company is the only Pacific line paying a dividend on its shares, while three out of five lines other than our own are in process of reorganization, which must wipe out many millions of the capital invested in those enterprises. Every other Pacific line except our own received enormous sums of money or lands or both as subsidies, while our line, or rather our company, has gone on steadily paying dividends to its shareholders for fifteen years . . ."

The Great Northern was promoted and built by men who came up the hard way in the transportation business. These men personally assumed heavy obligations. They knew the basic character of their territory and its potentials. A large part of the earnings were plowed back into careful expansion. While the goal was an ambitious one, forward steps were continually related to earnings available for growth. Debt was kept well within sound limits. Hill had demonstrated that even in a period of intense

competition a new project could prosper if practically conceived, conservatively financed, and capably managed.

As Hill and others of his breed expanded our railroad system, agricultural growth multiplied. Taken together, the two constituted the most dynamic elements in our economy. From 1860 to 1910 something over 800 millions of acres of improved lands were added to the nation's total. The number of our farms increased from 2 million to 6 million. Splendid advances were made in agricultural machinery, notable among which was the invention of the twine binder in 1878 by J. F. Appleby. We were not only adding more acres but were making all land more productive. Between 1860 and 1910 wheat production went from 173 million bushels a year to around 700 million. Even more impressive was the growth in wheat exports, which expanded from 4 million bushels in 1860 to well over 102 million in 1900. Our grain farmers were participating actively in world trade. A mounting volume of all agricultural exports enabled us to sustain a substantial increase in the importation of manufactured goods and pay the interest on growing amounts of foreign capital. From a national standpoint the opening of this new West was a paying business.

Another phase of this great western expansion was particularly colorful. This was the cattle business, with its vast ranch domains, two-gun cowboys, broncobusters, rustlers, roundups, rodeos, and "necktie parties"—all that dramatic color which still keeps the western movie popular.

It had its origin in Texas where herds of wild cattle, descendants of animals brought to Mexico by early conquistadors, roamed the plains. Shortly after the Civil War the practice grew of taking these Texas cattle north to the richer grazing areas of Kansas, Nebraska, and Montana. Thus many pounds of beef were added to the animals before they were shipped to market. Hence arose the famous "Long Drive" by which each year hundreds of thousands of Texas cattle were herded north, by handfuls of picked cowboys, to fatten on the open ranges.

The active period of the Long Drive was from 1870 to 1888. The movement of cattle was large. In 1871 over 600,000 head crossed the Red River headed north. In 1884 a count showed that 825,000 head had passed a given point within a ninety-day period. Loading these animals on the railroads for sale in Kansas City and Chicago brought into activity the cow towns with their great corrals of milling cattle and their hell-roaring saloons and gambling halls. Such were Abilene, Newton, and Dodge City, Kansas; Ogalalla, Nebraska; and later Miles City and Glendive in Montana.

As part of this process ranches were established in the central and northern sections of the open range in order to prolong the period of

fattening the cattle. Here were enacted lusty scenes when each spring and fall the ranch cowpunchers would round up, brand, and ship cattle. From the beginning it was a rough, two-fisted, he-man's life. Emerson Hough quotes a letter received by a ranch owner living in the East from his foreman on the western ranch: "Dear sur, we have brand 800 caves this round-up we have made sum hay potatoes is a fare crop. That Inglishman yu lef in charge at the other camp got to fresh and we had to kill the son of a ——. Nothing much has hapened sence yu lef. Yurs truely, Jim." ^a

The railroads made this business, and almost as quickly unmade it. They brought in "nesters" who settled in small farms in the choice sections of the open range. Then a roistering promoter, a hardware salesman later to attain fame in the steel industry, one John W. Gates, proved that barbed wire could be successfully used by the small farmer to protect his fields from the roaming cattle of the open range. By 1886 the open range was passing. The curtain was rung down on the Long Drive, the cattle baron, and the hard-riding, ballad-singing, Colt-carrying cowpuncher.

The brief existence of the cow-country business was important in several respects. It gave the early tank-town railroads of the West a source of income much needed while settlement was scanty. Secondly, the growing supplies of beef pouring into the stockyards at Chicago and Kansas City came at an opportune moment. Pork packers in these centers were ready to exploit and greatly expand the packing of beef and its sale in fresh condition. The movement of range cattle to the east provided opportunity to centralize beef slaughter and build up the great packing companies. Thus did Armour, Swift, Morris, Cudahy, and others profit by the new western rail lines, the Long Drive, and the more remote fact that Spanish hacenderos of sixteenth-century Mexico had taken such long siestas that their cattle had escaped north across the Rio Grande.

Methods of handling beef had not changed since Noah was a boy. As late as the 1870's cattle were shipped on the hoof to local slaughterhouses which killed from day to day only the amount which they could be sure of disposing of promptly. New York City had upwards of 200 of these slaughtering units. Any sizable butcher shop killed its own beef. The railroads built up a large volume of traffic in bringing live cattle to eastern consumption centers. But this was a costly business. Freight was paid on a lot of excess weight.

The possibility of a new method of selling beef was signaled when certain Chicago meat packers started to can beef shortly after the Civil War, using the new process which Gail Borden had already perfected for canning condensed milk. This business did not attain much volume until 1879.

Another simple discovery, however, worked a complete revolution in

marketing beef. This was the development in the late seventies of a commercially practicable refrigerated railroad car by Gustavus Swift, Chicago packer, and his Boston engineer, Chase. For some years before, experiments had been made in shipping dressed beef in boxcars which were cooled by piles of ice at each end. The results were encouraging. Then Chase and Swift brought to bear on the problem one of the basic rules in physics—cold air is heavier than hot and tends to fall and displace the latter. Why not, therefore, put ice at the top of the box cars and, as the cold air drops, permit the displaced warm air to escape through ventilators. Others were experimenting along the same general lines. The process proved practical. "Thus a simple application of elementary physics changed the age-old occupation of slaughtering from a local into an international business." ⁴ Even before this development in railroad cars, slaughterers of beef were installing refrigerating equipment in their plants, following the commercial development of ammonia cooling devices in about 1860. Artificial ice-making equipment appeared in the late seventies.

This evolution in the age-old practice of beef slaughtering posed new problems. The railroads refused to build refrigerator cars. To them it looked more profitable to haul live steers from Ogalalla to New York than to ship the live steers to Chicago and from there eastward to transport about half the original weight in dressed beef. Furthermore refrigerator cars were expensive to construct and operate. As a result the big packers built and operated their own. In a few years they had sizable fleets of new refrigerator cars, icing stations, and terminal cold-storage warehouses. Thereafter ocean steamships and foreign depots were similarly equipped. This put the large packing concerns in an impregnable position, as small slaughterers could not secure capital for equipment on such a vast scale. Public resistance to "cold-storage" beef gradually disappeared and the nation watched its meat business gravitate into the hands of the large packing companies of Chicago and Kansas City.

An industry of hundreds of small local slaughterers changed within a few years to one dominated by the "Big Four." Those were days of business concentration but seldom had it progressed so rapidly. The "Beef Trust" became at once a social ogre and a political issue. The cattle men of the West who were forced to sell to this handful of large corporations blamed the "Beef Trust" for low prices. The public became incensed at high-handed methods. There was something disturbing in this particular evolution of business whereby within a few years a small group of large corporations won control of the distribution of an essential food product. The quickening of public opinion on this score was one of the forces which led to the enactment of the Sherman Antitrust Act in 1890.

As the meat-packing industry helped to build the great industrial centers of Chicago, Kansas City and Omaha, the flour-milling industry was simultaneously developed in another western area. Minneapolis became the focal point of this activity and its enterprising businessmen brought about another great commercial concentration. In part this is the story of the long-continued westward movement of wheat production.

The Erie Canal had in earlier years established the city of Rochester as a great flour-milling center. The white wheat of the Genesee Valley and power from the falls of the Genesee River provided the means by which the flour-milling crown of the United States was won from the east-coast port of Baltimore. Then, as steamboats made the Mississippi River a great artery of inland transportation and as settlers poured westward, St. Louis and Cincinnati took up the industry. After the Civil War Milwaukee forged rapidly ahead and its production of somewhat more than a million barrels annually challenged St. Louis for leadership.

In the meantime what was seemingly an insignificant development had started further to the northwest in the new and sparsely settled state of Minnesota. Here at the Falls of St. Anthony (Minneapolis) on the Mississippi River, water power was used to operate saw mills for the growing lumber industry. Small capital accretions from this work enabled Minnesota businessmen to venture into the flour-milling field, employing the same water power to turn their millstones. Transportation was still by boat down the Mississippi.

Soon our wobbly little rail lines began to feel their way across those endless, windswept prairies of the Northwest and along its fertile river valleys. As settlers, mostly of Scandinavian ancestry, swarmed in, the crop which seemed most promising was spring wheat. The kernel of this wheat was extremely hard, however, and to the little mills at Minneapolis yielded only moderate returns of flour. Much of the glutinous outer portions were bolted out as middlings. Yet the latter were rich in food values. The problem was how to recover these essential values from the middlings. Upon the solution of this one difficulty rested the immediate future of the new Northwest.

Among those to take up this challenge was a certain trio: George Christian, representative in Minneapolis of an eastern flour commission house; George T. Smith, an experienced head miller; and Edmond La Croix, who was familiar with European practice. The three men put their heads together on this problem. Much secrecy prevailed and La Croix locked himself in his shop. Their efforts were well spent. Shortly they came out with the great "New Process." It involved a system of moving sieves, travel-

ing brushes, and an air blast to screen the refractory middlings and recover more flour.

Success was immediate. This technique ensured the supremacy of spring wheat as the finest breadmaking flour in the world. The middlings, formerly the main source of trouble, now became the chief reason for the superiority of the product. Minneapolis mills at once lent all their energies to market "New Process" flour. Within a few years another basic change in their practice was made—chilled-iron rollers in place of millstones, which had served without change almost from the beginning of time. Public acceptance of the new flour was excellent, and the production of spring wheat spread like wildfire. Minneapolis became the greatest flour-milling center of the world. Production jumped from about 200,000 barrels in 1870 to nearly 7 million in 1890.⁵

As we look back on these years we see that as the new railroads fanned out over the prairies, settlement followed and production mounted. Grain, beef, and pork in huge quantities were sent to feed city dwellers of the East and Europe. This was a great commerce. In turn it bred great industry. The center of American business moved westward, and western business was pushed to the far corners of the world. Of all the economic developments of the period this expanding importance of the Midwest is one of the most striking.

The hub of this explosive growth was that sprawling, brawling rail crossroads at the foot of Lake Michigan—Chicago. Its growth epitomized that of the whole West. Chicago became the business metropolis for the Mississippi Valley and Rocky Mountains as New York City had become for the nation at large. The reason for this lay in its position as a rail center. Most western roads ran to or connected with this one-time trading post on the Chicago River. In the early seventies as many as thirteen trunk lines led into the city. From practically all points of the compass these roads poured in a wealth of produce. Small wonder that between 1870 and 1900 Chicago's population grew some 468 per cent.

In the whirl of Chicago business the center of interest was the Wheat Pit—the trading room of the Chicago Board of Trade. Here it was that the new wealth of the West came to market. From the Canadian border to Texas, farmers small and big looked to the Wheat Pit for the grain prices which each year spelled success or failure. As went these prices, so went the cost of bread to people in the East and in Europe. By the price of wheat manufacturers in the East gauged the buying power of the million of consumers in the West.

The Wheat Pit was the scene of hectic orgies of gambling. Fortunes were won or lost in a few hours. Men of great wealth set the stakes high.

Armour, Leiter, Cudahy, "Old Hutch," and many others sat in on the game. At times the eyes of the world would be turned on the Wheat Pit as millions of dollars hung on the fluctuating price of wheat. One of the most skillful traders was old P. D. Armour who was wont to disclaim the importance of his operations on the Board of Trade. He once put off a persistent newspaper reporter with the remark: "Why, I'm just a butcher trying to go to heaven."⁴

On a memorable occasion in 1897 Joseph Leiter bought heavily of wheat until it was said that he had contracted for some thirty-five million bushels. It was reported that he was trying to corner the market, later to sell at his own prices. Armour had offered to join him in this adventure but Leiter rejected his cooperation. In November when Leiter thought his success assured, it appeared that there was a large short interest owned by Armour. The duel of giants was on. Leiter, the bull, was buying for a rise. Armour, the bear, was selling for a decline. The jackpot ran into millions. Armour and other bears held back deliveries until December when at their instance all the wheat in the world seemed to converge on Chicago at once. Then, as a final coup, Armour chartered a fleet of boats to keep the harbor of Duluth open and thus assure a flood of unexpected late deliveries. This was the last straw on Leiter's straining back. The price of wheat broke. Armour had won. Leiter lost over nine million dollars and it was Armour's banks that took over the wreckage.

These bursts of sensational speculation were only the froth on the brew. Underlying all this was a sound, vigorous growth of economic power. Chicago had become the world's leading food market. American wheat was helping to feed the British Isles, and Chicago was its gathering point. The packing of pork and beef was a growing, international business and Chicago was its center. Armour, Swift, Morris, and Hammond were taking bawling steers and squealing hogs to the Union stockyards and shipping finished meat products all over the world. They could scarcely build new plants fast enough for the growing demand. By-product usages grew faster than fleas on a dog. Horns, hoofs, hair, hides, bones, intestines—all went to market.

The Windy City was also preeminent in the manufacture of agricultural machinery. Cyrus H. McCormick lived to see the business he had built from scratch sell 55,000 reapers in 1884. George Pullman developed the modern sleeping car. In addition, the plants of Illinois were turning out more railroad cars of varying kinds than any other state in the union.

As befitted a great grain center, Illinois led in the production of distilled liquors. With an abundance of coal and relative proximity to the Lake Superior iron fields, the state also developed a large steel industry, rank-

ing third in the nation. When J. P. Morgan created that gigantic steel combination, the United States Steel Corporation, Elbert H. Gary, a Chicago lawyer, became its head. Chicago banks were large and well managed. With its central location and extensive rail connections, farmers of the prairies, ranchers of the foot hills, and miners of the Rockies, all found this city a convenient crossroads at which to do business. The industrial West was an electric, dynamic component of our economy. The atmosphere sparkled with expanding enterprise, bright hopes, and confidence in an assured destiny.

So much for the manufacturer and merchant. The farmer's status was somewhat different. From the Civil War to the end of the century the long-term trend of grain prices was downward. He faced recurrent scourges, drought, and grasshoppers. In many years he did poorly. Then along would come a short crop in Europe and all would seem rosy. This farmer-settler did his own thinking and during these years it was not always marked with complacency.

If there are those who believe he looked with a benign and grateful eye upon the railroads that served him, let them make another guess. Within a very few years farmers developed a pronounced anti-railroad point of view. This was quite natural. The railroad was the only means the western farmer had of getting his produce to market, whereas those settlers who farmed in the East or in the Mississippi Valley usually had a choice between water and rail transportation. The western farmer, therefore, came to feel that he was in the hands of a monopoly and that railroad freight rates were an unjust tax on his product.

This attitude made for the success of the so-called "granger" movement, which left a very decided stamp on the course of social and political events. The "grange" was a local organization of farmers which operated within a loosely-drawn state and national system. At times its work was semi-secret. It provided the farmer not only with a social outlet but also with a means of organizing to seek relief from his economic problems. In the early seventies there were granges in all but four states.

Grange activities to better the lot of the farmer took two main lines. First, all kinds of cooperatives were tried, and there was even an attempt to make agricultural machinery. The second and more successful method was a drive on the railroads for reduction of rates and regulation of rate-setting. This latter activity brought the granges much public attention and by it the "granger" movement is generally known. It contributed to the creation of regulatory commissions in several western states. Yet even more important was its influence in securing the passage of the Interstate Commerce Act and the establishment of federal railroad regulation.

The precarious economic position of the western farmer also fostered another so-called liberal movement. As troubled years and falling grain prices pressed upon him he found difficulty in paying for goods and equipment. He needed more money. Quite naturally, he translated that into a national necessity; the country needed more money. As we shall see, he went out politically for paper money and expanded currency. In a word, he became the country's greatest inflationist. He was also not afraid to throw his weight around. In consequence this easy-money farmer was to keep Congress, banking, and business in a constant state of uncertainty down to the end of the century.

PACIFIC COAST EMPIRE

An Adventure in Monopoly

THE pattern of California's economy has been a changing one. Under Mexican rule the main occupation was raising horses and cattle on vast ranches ruled by feudal hacenderos. Hides were the principal export. Then, from about the time California was ceded to the United States in 1848 until late in the 1850's, the gold fever raged. Next, as settlers took up fertile acres in the great central valley, wheat production became the most important activity. An active trade with China was developed. Chinese immigrants and merchandise arrived to give San Francisco a touch of the Orient in its cosmopolitan make-up. In 1873 the first seedless orange was imported from Brazil, and thenceforward fruitgrowing took hold rapidly. Finally, in the twentieth century came the discovery of rich oil fields and the garish effulgence of the movie industry. Quite a panorama of change since the devout friar, Junipero Serra, founded his chain of missions along that sundrenched Pacific Coast at the time thirteen little colonies on the Atlantic Coast were setting up a new nation.

While the completion of the Pacific railroad served a great purpose both for the nation and for California, its blessings, especially for the citizens of that state, were not unmixed. The four men who, after Judah, were responsible for the building of the Central Pacific were projected into positions of power unparalleled elsewhere in the country. They acquired a monopoly of the transportation of the State and thus could levy tribute on each of its citizens. Within a few years they dominated not only the railroads, but also river routes, transpacific shipping, and terminal facilities. The small businessmen of Sacramento had become the Big Four of California—Huntington, Stanford, Crocker, and Hopkins.

From the early seventies until the turn of the century the history of business in California revolves around the struggle between its citizens and

the Big Four. It was a battle which raged over a wide front from freight rates to political power. No holds were barred and no quarter given.

Even before the completion of the Central Pacific, these four Sacramento merchants had become enthusiastic railroad men. Theodore D. Judah in selling them the idea of a Pacific railroad had made converts of no little ardor. Turning their attention to intrastate traffic, they bought two small tank-town railroads—the California Central and the Sacramento Valley. With these as a nucleus they began the construction of two new roads, the California and Oregon which went north up the Sacramento Valley, and the San Joaquin which ran south through the valley of that name. These railroads were shortly to evolve into the most profitable and powerful instrument to come into the hands of the Big Four—the great Southern Pacific Railroad. In 1869 they acquired the important California Steam Navigation Company, which gave them control of the principal inland waterway traffic between San Francisco, Stockton, and Sacramento.

The reason that these moves were of such import is to be found in the physical characteristics of the State. The great bulk of productive land lies in the central valley which runs almost half the length of California between the Sierra Nevada on the east and the Coast Range on the west. To the fertile acres of this vast area came first disillusioned gold seekers and then increased numbers of farm immigrants. It was therefore a farsighted stroke when these Sacramento merchants got their hands on the only transportation routes by which the growing riches of the Sacramento Valley in the north and the San Joaquin in the south could be brought to market.

This remarkable conquest only served further to stimulate the ambition of the four. They now went out after big game. The great ocean carrier of the West Coast was the Pacific Mail, which had long dominated San Francisco's deep-sea trade. It maintained a semimonthly service to the Orient carrying flour and specie out-bound and returning with coolies and general merchandise. The Big Four decided that they too must have a transpacific line with which to subdue the proud Pacific Mail. They organized the Occidental and Oriental Steamship Company, and chartered fast ships from the British White Star Line. The fight was on. In retaliation the Pacific Mail put into service a streamlined new fleet.

The struggle between these two groups was particularly bitter. The Big Four slashed rail rates in an attempt to capture traffic that the Pacific Mail had enjoyed for years by way of the Isthmus of Panama. Agents put all kinds of pressure on shippers. Finally a stroke of bad luck occurred for the Pacific Mail. Acting upon charges of fraud in connection with the grant of mail contracts to that line, the government cancelled those agreements.

Fearing the effects of further cut-throat competition, the Pacific Mail made peace on humiliating terms which left the Big Four in a dominant position. They now ruled a business empire more comprehensive than anything we were later to see in the East. Rockefeller and Carnegie both reigned supreme in their respective industries, but here was a whole state paying tribute directly or indirectly to four men.

Nor was this power so exercised as to endear them to their fellow man. Freight rates were set on the principle of charging all that the traffic would bear. It was alleged that at times their railroad agents went so far as to examine the books of shippers to determine whether rates could not be raised another notch. As they kept tightening the screws public opinion grew increasingly incensed. The "Octopus" came to be thoroughly hated by wheat farmers, fruit growers, merchants, and exporters.

Commercial interests of the State began to fight back. Businessmen of San Francisco became the leaders of the opposition. Traditionally they had never thought much of these upstarts from Sacramento who had gained such a big jump on them by building the Central Pacific. Accordingly, a group of leading merchants organized their own steamship line to bring goods from New York to San Francisco by way of Cape Horn. The Big Four answered the challenge, and a vicious rate war started. At one time water charges dropped so low that freight could be moved from Kansas City by rail to New York and then by steamship to San Francisco cheaper than by direct rail from Kansas City to San Francisco.

Then the embattled merchants and shippers formed the Traffic Association of California. This revolt of businessmen against the railroad monopoly gradually gained force. Their most effective weapon was the use of independent ocean shipping. The Central Pacific and the Southern Pacific lost a lot of business. Finally it became apparent to the Big Four that the revolt would never be quelled by coercion. Peace was accepted as the better way, and during the 1890's freight rates were drastically reduced. Independent shipping interests and small businessmen had defeated one of the most alarming attempts at monopoly that the country has seen.

In the 1870's fireworks of a spectacular variety were again set off in the mining field. They were provided by the discovery of the great bonanzas at Virginia City. Lying over the state border about 300 miles east of San Francisco, this riotous mining camp drew its men, capital, and sustenance from California. In return came a fantastic flood of both gold and silver for a brief five years. Then almost as quickly as it had been opened the fabulous ore body petered out. The booming mining camp became a ghost city.

Hard-boiled, underground miners are accustomed to refer to successful members of their kind as those "having a fine nose for ore." In this matter of sensitive proboscises, there were none quite as effective in Virginia City as those possessed by John W. Mackay and James G. Fair, a couple of hard-working Irishmen who had come to the Comstock about 1860. By the early seventies through intelligent application and fortunate investment they had become small capitalists as well as practical mine operators. Up to this time the area had produced first placer gold and later moderate values in gold-silver ores. San Francisco capitalists led by the Bank of California were the dominating interests. The two lads from the Emerald Isle were definitely small fry.

Success in mining not only requires a nose for ore but a stout heart as well. In 1872 Mackay and Fair had purchased for about \$100,000 a controlling interest in the stocks of two mining companies of indifferent record—Consolidated Virginia and California. They planned to explore at depth areas which had hitherto been considered quite worthless. Capital was raised by the usual method of those days—assessments on the outstanding stock. Several hundred thousand dollars were spent in development work with practically no result. The wise men of Virginia City were shaking their heads in knowing commiseration.

But Fair and Mackay were following more than a hunch. They had picked up a fine thread of rich ore. As practical miners, they knew that it might possibly lead to a sizable ore body. Their gamble won. Just as Virginia City and the big San Francisco interests were about to condemn this venture as one of utter folly, the little thread of ore turned into a seven-foot vein. Lower down the width was over fifty feet. Then as the work progressed through 1873 and 1874 Mackay and Fair hit the bonanza they had been looking for. The ore body widened out to a spread of from 150 to 200 feet. It was of extraordinary richness. Contrary to usual practice, no great secrecy had shrouded the discovery. This threw speculators completely off the scent.

Finally information reached San Francisco that Mackay and Fair had broken into one of the great treasure chests of all time. Speculators went mad as bonanza stocks were bought and sold in frenzied trading. Within a few months' time the market value of Consolidated Virginia stock had multiplied many times and that of California had risen from \$40 to nearly \$800.

The speculative fever touched all mines of the district. Excitement centered around the stock board of San Francisco, upon which were posted the widely fluctuating prices for both producing mines and the wildest promotions. Everybody traded, from millionaires down to domestic serv-

ants. Shares bought one day at 25¢ might shortly be bid up to \$50 or \$100. The nation had never before witnessed such hectic public gambling. "Timmy," a popular bartender at Jim Flood's *Auction Lunch*, starting from scratch built up a fortune of \$250,000 on tips from customers whose moods became confiding after a few drinks of mellow whiskey.

In this, as in other great speculative orgies, people lost all touch with reality. The more preposterous a venture was, the more it attracted a following. In 1873, for example, two mysterious prospectors showed up in San Francisco with a bag of diamonds that they claimed had been mined at diggings of fabulous richness in an inaccessible part of Arizona. Men literally fought for the privilege of being allowed to buy an interest in these new diamond mines. Finally twenty-five of the city's leading citizens were selected for the inestimable privilege of subscribing a large sum of money. Then suddenly after these knowing capitalists had gotten themselves well out on the end of the limb, the balloon was punctured and the fake exposed. The specimen stones were diamonds all right—but they had come from a dealer's vault in England.

Naturally mob insanity of this kind was bound to leave a trail of wrecked humanity behind. These ruined speculators, many of whom had once been prosperous, haunted the notorious Pauper Alley in San Francisco. There, over an occasional glass of beer in cheap saloons, they hoped to get the final tip that would put them back in the game, on the road to fortune. Among them were many women known along Pauper Alley as "Mud Hens." Their male counterparts were "Dead Ducks."

In spite of this tumult of speculative fever in the 1870's and the long rate war with the railroads, the basic economy of the State forged steadily ahead. Shipments of grain from the central valley, directed by San Francisco merchants, were each year raced to Liverpool in fine-lined clippers from our East Coast or in iron sailing craft built on the Clyde. Coastal commerce grew rapidly. Streams of new settlers poured in by ship and over the Central Pacific and the Southern Pacific. Fruit crops were multiplied. Small industries sprang up. There was dynamic growth in the air, tempered in the people by a strain of *dolce far niente*. This was truly a country of the more abundant life.

HARD MONEY VS. INFLATION

A Thirty Years' War (1866-1896)

WHILE the period from 1865 to 1900 was one of expansion in land settlement, in far-flung railroad development, and in general business progress, not all economic factors were favorable. The problem child in an otherwise happy family was the nation's currency.

What was going on was really a Thirty Years' War between currency inflationists on one side and the "sound money" people on the other. It was a protracted struggle between those who believed that the ills of depression years were caused by a shortage of money and those who thought that currency tinkering only made matters worse. Narrowed down, it was a conflict between the agricultural West and the industrial East—between the farmer inflationist and the businessman.

The issues cut deep. Farmers of the Midwest sought higher prices for their crops through an increase in the money supply. In opposition, the majority of our merchants, manufacturers, and bankers feared inflation as the devil fears holy water. From bitter experience they saw it as a habit-forming drug—small doses of which inevitably led to larger ones. In the end it would spell disaster for all, with its most cruel burdens fastened on people of low income.

Businessmen regarded the nation's prosperity as linked firmly to a stable currency for other reasons. From the days of Plymouth foreign trade had been a vital element in our economy. Moreover down through the years we had been a debtor country for funds desperately needed in developing our great natural resources. Obviously a shifting and unpredictable monetary system would hamper such trade and discourage the inflow of foreign funds. For assuring the currency stability which these businessmen saw as essential they relied on the gold standard. The principal battleground was Congress. Here both sides fought to enact laws embodying their respective ideas about the currency.

For the western farmer a large part of the difficulty lay in the fact that he had become involved in international trade. During the Civil War we had substantially increased our shipments of grain to England. As the new railroads magically touched the great prairies into production, this tide of exports rapidly expanded. We became the greatest contributor to the world's grain market. It was a helpful thing in balancing our foreign payments. It did not work out so well for the farmer. His income came to depend upon a world price structure. Unfortunately for him, as the years of this period advanced, heavy shipments of grain from hitherto remote foreign sources began to come to the world marketplace. New railroads were also tapping producing areas in Hungary, Russia, Argentina, and Canada. "Prices, in short, which rose almost continuously throughout the world during the period of slack production from 1858 to 1873, receded almost as continuously in the ensuing generation."¹

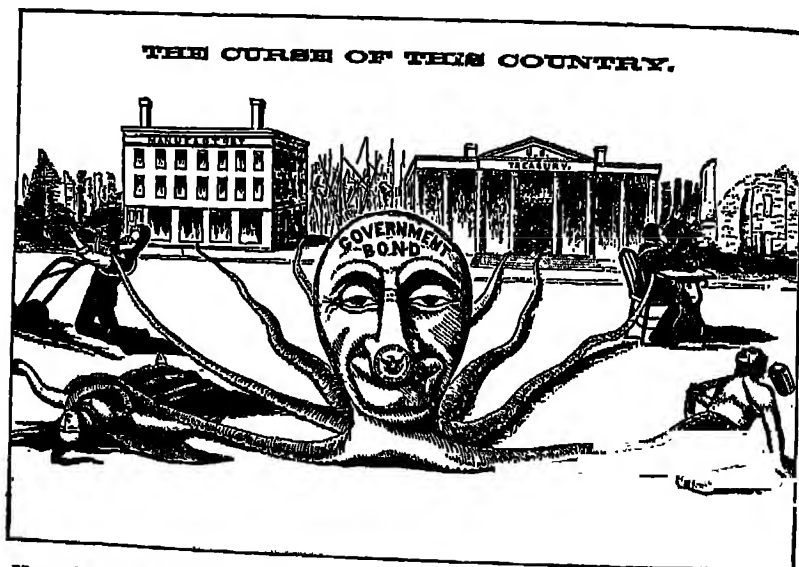
Our grain growers were caught in an economic downdraught. While they might increase their own production, the return for this effort tended to be steadily less. It was this price squeeze of worldwide leverage which largely fostered the idea that the only thing wrong was that the country did not have enough money.

The sharp alignment of forces upon currency questions began to take shape shortly after the cessation of hostilities. During the war years we had issued some \$400 million of greenbacks and currency in circulation had increased about two-thirds. After the war the question arose of retiring these greenbacks. It was generally assumed that, being in the nature of emergency war issues, they would be redeemed as promptly as our income would permit. However when the business disturbances of 1866-1867 occurred, the "more money" people mobilized and forced Congress to abandon the retirement principle. This was the first victory for the inflationists and it was made to stick. Thenceforward for years the country was to continue with greenbacks outstanding in amounts varying between \$346 and \$382 million. Considering our resources and productive output that was a sizable degree of inflation. Nevertheless this triumph did not satisfy those who looked upon more money as a panacea. They began to press for an increase in the issue of greenbacks or legal tender notes. For some time this attack seemed to be making headway but in 1874 President Grant checked the drive with a courageous veto.

The most irritating thorn in the flesh of the farmer was the gold payment provision of our government bonds. His viewpoint was understandable. Domestic business was being done with an inflated paper currency. Greenbacks constituted a large part of the farmer's money. On the other hand bondholders, among whom were large eastern banks and foreign investors,

were paid their interest in gold. In the years right after the war the gold dollar was worth anywhere from \$1.40 to \$1.47 in greenbacks. When the farmer cogitated on this difference, he not only saw red, he saw colors way beyond the ordinary spectrum.

Moreover some bond issues of war years were put out under acts which, while specifying that interest should be paid in coin, were not definite about the payment of principal. Quite naturally the farmer believed that if he were forced to accept payment for his grain in greenbacks, the holders



How the farmers of the Midwest felt about the payment of government bond interest in gold

Culver Service

of government bonds should be put on the same basis. Accordingly, there developed in the West a strong movement to pay off these government bonds in paper currency. By its friends this was called the "Ohio Idea"; by its opponents, the "Rag Baby." Many people, however, recognized that the good faith of the Treasury was involved. When the bonds were originally sold it had been generally understood that principal as well as interest would be paid in gold.

Upon taking office in 1889 President Grant called unequivocally for payment for both principal and interest in gold. Congress endorsed his declaration with the Act of March 18, 1869. This was bad medicine for the inflationists who proclaimed that the poor farmer and laboring man

had been sold down the river to the banks, eastern plutocrats, and sinister foreign interests.

Finally this unrest in the agricultural areas became so strong that a political party was formed to carry the torch. The Greenback, or National Party, was supported by more than a million votes in the Congressional elections of 1878. The new party opposed resumption of specie payments; advocated more greenbacks; proposed the elimination of bank notes; and was against the sale of gold bonds in foreign markets. Its members sought a non-exportable currency.

In the light of these pronounced currents of feeling, it is interesting to note the circumstances which permitted passage of the Resumption Act in 1875. The paper money issue cut across both parties. Even with a strong Republican majority in Congress the hard money people had not been able to restore to our paper currency free convertibility into gold. Along came the panic of '73. Smarting under this suffering, our people took it out on Congress, repudiated the Republican members, and elected a Democratic majority to both Houses in 1874. Then, before the new members were seated, the "lameduck" Republicans, having nothing to lose politically, passed the Resumption Act of 1875. It was a deathbed repentance.

This bill provided that four years later, on January 1, 1879, the Secretary of the Treasury should "redeem in coin the U. S. legal tender notes then outstanding on their presentation for redemption." But the inflationists had not been completely worsted. In their zeal to maintain large circulation, they had been able to force into the Act a provision that was later to give serious trouble. This was the condition that when legal tender was redeemed by paying out coin the greenbacks so received were not to be cancelled but were to be reissued in the normal process of government spending.

At this stage the Thirty Years' War really got under way. It was fortunate for the cause of the anti-inflationists that John Sherman, brother of Gen. William Tecumseh Sherman, had been made Secretary of the Treasury in March 1877. As a general in the cause of sound money John Sherman waged a distinguished and courageous campaign. He held firmly for resumption and aggressively built up a gold reserve. In spite of public clamor for repudiation he declared for payment of the principal of government bonds in gold.

The inflationist campaign then took a major shift. A new and tempting line of attack appeared. Paper money was largely forgotten. Free coinage of silver became the weapon with which they would beat down the bloated

bondholders and subjugate the gold money men. This campaign gathered strength gradually and very nearly succeeded.

Various events were contributing to the inflationists' cause—occurrences which once again indicated the delicate interrelation between widely separate elements of a worldwide economic system. In 1871 Germany had adopted the gold standard and began to sell old silver coin as bullion. In 1873 the countries of the Latin Monetary Union placed a limitation on the coinage of legal tender silver. Meanwhile, apparently as unrelated as something on Mars, way off in the high Sierras two adventurous miners from Erin, Jack Mackay and Jim Fair, tunnelled into a treasure house of silver—the Comstock Lode.

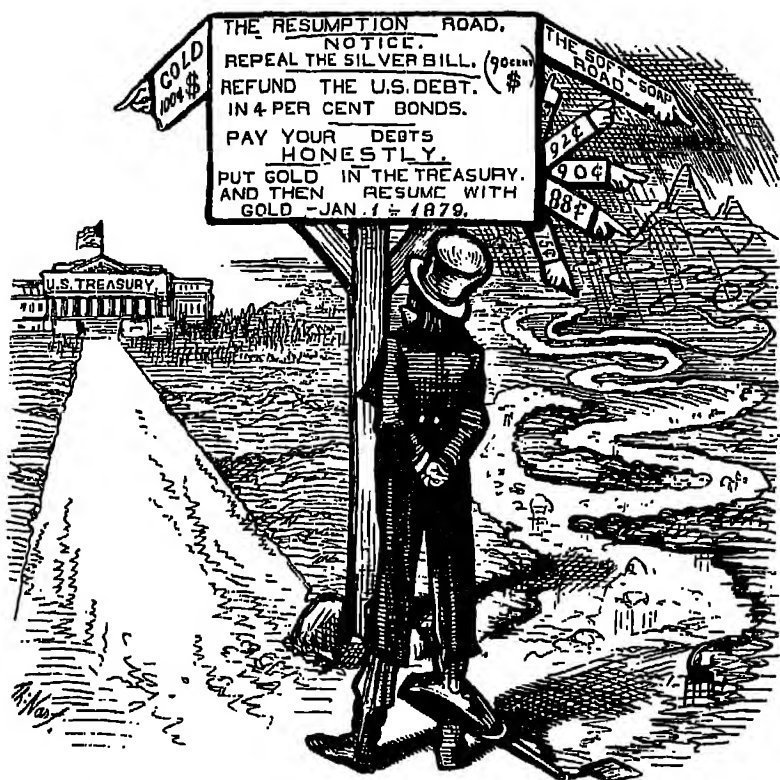
As a result of these factors the supply of silver on the world market was greatly increased while that of gold was declining slightly. The traditional commercial ratio of about $15\frac{1}{2}$ to 1 was completely changed and began to fluctuate in the neighborhood of 18 to 1. With this decline in the price of silver its position in the United States was fundamentally altered. Silver was now worth more if coined into dollars at the former statutory ratio of 16 to 1 than when sold as bullion in world markets. A revision of the coinage laws in 1873 had inadvertently dropped the provision for coining silver dollars, an action which was overlooked until the price of silver fell. When the inflationists and silver producers woke up to this situation, a great clamor arose. The omission of provision for coining silver dollars became "The Crime of 1873." Henceforward the inflationists and silver men of the Far West had a common cause—the restoration of free coinage of silver at the ratio of 16 to 1. Under such a program the nation would be given more money and the silver miners assured of a better market and higher price for their product.

These allies won their first battle. In 1878 Congress, over the veto of President Hayes, passed the Bland-Allison Act. This authorized the Treasury to purchase \$2 million to \$4 million worth of silver bullion each month at market prices. Silver thus acquired was to be coined into silver dollars. Silver certificates in denominations of not less than \$10 could be issued against the deposit of such coin. In the twelve years of this authority some 378 million silver dollars were issued.

While this was considered a great victory by the inflationists, the silver dollars were not popular with our people. Banks balked at settlements between themselves in this medium. Individuals complained of the silver dollar's bulk. Much of the coin found its way back to the Treasury.

In spite of this first success for the silver men Secretary Sherman pressed forward relentlessly to accumulate gold. By January 1, 1879, the date that resumption was to become effective, he had built up a reserve in gold

equal to 40 per cent of the Treasury's outstanding paper. The law did not define the proper reserve; Sherman simply followed the practice of the Bank of England. As the final date approached the differential between gold and paper disappeared. Resumption of specie payment for paper currency became effective without incident. Practically none of the legal



WHY TAKE A CROOKED ROAD WHEN THERE IS A STRAIGHT ONE?

Cartoon on the silver question, *Harper's Weekly*, April, 1878

Culver Service

tenders were presented for exchange into gold. The forces for sound money had successfully established a beachhead. But they were not yet secure.

Now the scene crosses the Atlantic. About six months later, on a Sunday early in July, supported by the solemn ritual of the Established Church, the Archbishop of Canterbury arose and asked the prayers of the nation for fair weather. What conceivable connection could this have had with Secretary Sherman, gold payments, and the American inflationists? It had

a direct bearing. The adverse condition of England's weather just about saved the day for our recently restored gold payments.

The early months of 1879 had seen a sharp slackening of business activity in America. English interests were selling their holdings of American securities. These conditions alarmed our businessmen as probably forecasting heavy exports of gold. Since resumption, people could, of course, take greenbacks to the Treasury and demand gold which could then be exported. It began to look as though our struggle to sustain these resumed specie payments would be a nip-and-tuck battle. There was danger that the Bank of England might become the ultimate recipient of the precious gold reserve of \$133 million which Sherman had accumulated.

Then nature intervened. England and the continent got the worst mess of cold, rainy weather imaginable in the late spring and early summer of 1879. Some crops were reduced by over 50 per cent. On our side of the Atlantic, however, the sun shone bright on the prairies. The wheat crop was the largest we had yet produced. The price went up 40¢ a bushel in six weeks. For a while we exported something like a million bushels a day. But that was not all our good luck. Nature took another slug at John Bull. There was a partial failure of the Indian cotton crop. We shipped more cotton than ever before.

These quirks of nature completely reversed the gold movement. England had to pay partly in gold for these unusually heavy shipments of wheat and cotton. The Treasury's gold reserve went up from a dangerous low of \$120 million in June to \$157 million in September. The resumption of specie payments was made secure for the time being. The sound money people could now consolidate their victory.

Within a few years after we had thus reestablished the convertibility of our paper money we were confronted with another set of financial problems. Strangely enough these arose from the existence of a Treasury surplus. Most individuals have an idea that a surplus is something they would like to live with for the rest of their lives. Yet the handling of a government surplus entails complicated problems, the solution of which may lead to strangely ramified consequences—we recall the surplus during Andrew Jackson's administration which gave rise to the unprecedented procedure of handing out a bonus to the states.

In the 1880's and early 1890's the Treasury surplus was responsible in a great measure for a deflation of the nation's money supply. Outstanding bank notes went down from \$344 million in 1880 to \$185 million in 1890. This result was wholly unintentional. To the western farmer inflationist it was positive proof that insidious forces were striving to encompass his ruin. Nor were eastern manufacturers and merchants happy about it.

The manner in which this untoward condition arose is interesting. In the first place it is to be noted that the Treasury surplus of those days was no mere pittance. For the eleven-year period, 1880 to 1890 inclusive, the average annual surplus of income over expenses was almost \$100 million out of revenues which averaged about \$367 million. Thus better than one dollar out of every four collected in taxes was not appropriated.

The obvious remedy from the point of view of the Treasury would have been to reduce taxes. But this meant a lowering of the tariff because that was the principal source of revenue. To the Republicans such a course was anathema. They had nailed their banner to the protective tariff for the dual purpose of fostering domestic industry and protecting the wage standards of American workmen. As champions of a low tariff, the Democrats were neither united nor effective.

As each year during the 1880's surplus revenue came into the Treasury it seemed unwise to allow this money to remain idle in government vaults. The effect, of course, would be to withdraw such amounts from the legitimate needs of the country's business. It would lend strength to the campaign of the inflationists. The problem was how to get it back into circulation.

Many proposals for spending were brought before Congress, such as increased appropriations for river and harbor improvements, coast defense, and restoration of the merchant marine. However, the only one which met with effective support from both parties was the outlay for pensions. This increased from about \$56 million in 1880 to over \$106 million in 1890.

In spite of its embarrassment Congress refused to adjust the tariff effectively and the surplus continued to mount. "In August, 1888, it was literally true that the Treasury's cash surplus, wholly removed from the use of trade, was one-fourth as large as the entire estimated sum in the country's outside circulation."² The Treasury finally resorted to a procedure which led indirectly to further money difficulties. Large amounts of government bonds were redeemed, far beyond ordinary sinking fund requirements.

As long as bonds could be called at par, in moderate amounts, this created no difficulty. But by 1886 such bonds had practically all been retired. Those that remained were currently non-callable and the Treasury was forced to buy in the open market. Heavy purchases by Government forced prices upward. From 1886 to 1890 the four per cent bonds of 1907 sold between 123 and 130.

These high prices for government bonds created an astonishing and completely unexpected situation. Under the National Banking Act of 1863

banks could issue banknotes only if secured by government bonds. When prices for such bonds went to these high levels, the banks found it profitable to sell bonds and retire corresponding amounts of notes. Therefore, as the Treasury bought bonds with the idea of putting money back into the business system, a contraction of currency was taking place as the banks sold bonds and retired banknotes. This picture of currency confusion contributed little to the equanimity of the western farmer.

Nevertheless there was one favorable result from the otherwise muddled situation. Government debt was retired at an unprecedented rate. The net debt was reduced from \$1,996 million in 1879 to \$891 million in 1890.

In the meantime the movement for unlimited free coinage of silver was gaining rather than losing momentum. In 1889-1890 six new states of the northwest were admitted to the Union. This provided the silverites with additional strength in Congress, especially in the Senate. The inflationists were now ready for a major offensive.

No time was lost and in July, 1890, the Sherman Silver Purchase Act was passed. In effect it increased the amount of silver to be purchased to the point where the whole American output was provided for. The Treasury was authorized to buy 4,500,000 ounces of silver each month and to pay for such purchases with new treasury notes which should constitute full legal tender.

It was in the redemption provision relating to these notes that the silverite inflationists planted a delayed action bomb. Its effect was to cause the Treasury from 1892 to 1896 to teeter continually on the brink of default in gold payments. Rarely, if ever, has a recalcitrant Congress handed the Executive branch such an extremely barbed legislative porcupine!

In seemingly innocuous words Congress gave authority to the Treasury to redeem these new notes in gold or silver, under a declared policy of maintaining a parity between the two metals. When commenting upon this provision later, President Cleveland wrote: "It is hardly necessary to say that the assertion in the Act of 'the established policy of the United States to maintain the two metals at a parity' had the effect of transferring the discretion of determining whether these Treasury notes should be redeemed in gold or silver from the Secretary of the Treasury to the holder of the notes." *

The passage of this act taken as part of the general campaign of the inflationists was disturbing to businessmen and to European holders of American securities. Obviously the silverites were gaining in their program. It began to look as though they would shortly succeed in their ultimate goal of unlimited silver coinage and the free use of silver in redeeming govern-

ment obligations payable in "coin." Hitherto the word "coin" had always been understood to mean gold.

Events were now moving inexorably to a climax. The pressure to secure gold from the Treasury became greater than ever. The significance of this was not lost upon Treasury officials. In August of that year we find them taking a fateful step. The subtreasury in New York City ceased making its clearing house settlements in gold as it had done for years and began using notes instead. This move deprived the banks in that great center of foreign trade of a normal source of gold for commercial uses.

These banks and their customers promptly turned the tables on the Treasury. They began paying government custom dues in notes instead of gold. Then, for such gold as was needed for export, they would present notes for redemption. This was not a reassuring situation. Both the subtreasury and big New York banks were clinging to gold and paying each other in paper. "The first step in the depreciation of the currency had been made; the others followed, some of them immediately, others only after a lapse of a year or more, but all in a sequence marked out by inexorable economic law." ⁴

Meanwhile events in England were building up to our disadvantage. A stock market panic occurred in the fall of 1890 when the great banking house of Baring Bros. failed. English investors began selling American shares in order to repatriate gold. As a result of this mounting pressure the Treasury's condition continued to deteriorate. Between June, 1890, and June, 1893, the net gold reserve fell from \$190 million to \$95 million.

In March, 1893, as Grover Cleveland went into the White House for the second time, things looked grim indeed. The Treasury notes which were issued to buy silver were being presented in a mounting stream for conversion into gold. A disturbing rumor spread through the community that the Treasury, faced with a rapidly declining gold reserve, was about to substitute silver for gold in its note redemptions. Then there occurred another instance of that strange and sensitive interrelation between apparently unconnected parts of the world business order. The British government suddenly stopped the free coinage of silver in India. The world price of silver bullion broke: ". . . it came at a moment when public opinion, at least in the Eastern States, was aroused to a belief that the entire financial problem was associated with the coinage of silver; and it thus furnished one of the contributory forces which drove the commercial community into a state of panic." ⁵

Upon taking office Cleveland had courageously demanded a repeal of the trouble-making Silver Purchase Act of 1890. Congress paid little attention, however, until the panic struck in the late spring and early summer.

Then the House acted promptly but the Senate dawdled. It was not until November that the ill-conceived law was rescinded.

In the meantime Secretary of the Treasury Carlisle was fighting a tense rearguard action to maintain a gold reserve and continue the convertibility of notes into gold. Deflated business conditions had reduced government revenues so that the Treasury surplus of the 1880's had given place to a monthly deficit. In early 1894 the net reserve of gold in the Treasury had fallen below \$65 million and was constantly declining. Something had to be done.

Carlisle called on Congress to authorize new bond issues payable in gold so that they might be sold for sufficient gold to replenish the dwindling Treasury reserve. Congress did nothing. Dominated by the inflationists, they were playing their own game. With a large surplus of silver in the Treasury they were trying to force Cleveland to use the silver in redeeming legal tender, greenbacks. Why, they said, should we put out interest bearing bonds to buy gold when, without such expense, we have a world of spendable silver in the Treasury?

In consequence the Treasury was forced to act under an old authority and twice within a period of ten months got a banking syndicate to subscribe in gold for 5 per cent bonds at a high premium. The net gain for the Treasury was little because nearly half of the subscribed gold came from presenting legal tender notes to the Treasury for redemption! An operation of almost classic humor had it not been so tragic.

This was the climax to the fantastic system under which the Treasury was compelled to work. It will be recalled that under the Resumption Act, owing to the clamor of the inflationists, the Treasury could not cancel or contract legal tenders upon redemption but must reissue them in the normal course of expenditures. With the Treasury gold under pressure for export, this constant issue and reissue of legal tenders simply acted as a syphon more effectively to exhaust the Treasury gold reserve. The condition had been greatly aggravated by the increased volume of legal tender notes pumped into circulation by the Silver Purchase Act of 1890.

This vacuum cleaning of the Treasury vaults worked smoothly and effectively. By January of 1895 some of our fellow countrymen were lending a helping hand. Gold was not only exported, there was domestic hoarding as well. In that month alone the Treasury lost \$45 million worth of gold in redeeming legal tender notes. It was obvious that the Treasury's supply was about all gone. Businessmen and bankers began to prepare for our going off gold payments and for again doing business in a depreciated currency. It looked as though Dame Fortune had finally decreed the

triumph of the inflationists and the ignominious defeat of the sound money men.

If that was what the inflationists thought they could not have been more grossly mistaken. Congress continued to stall, hoping to force the Treasury to abandon gold payments and instead make use of the silver surplus. They might well have succeeded but for the fact that there was a fighting man in the White House. The situation called for quick action. It called for a man of strong will and political courage. Grover Cleveland had both.

This crisis brought together in a common labor two of the most forceful characters of those Not-so-gay Nineties—President Grover Cleveland and J. Pierpont Morgan, head of America's most famous banking house, J. P. Morgan & Co. A meeting was suddenly called in Cleveland's office on the night of February 7, 1895.

The situation had become really desperate. There was just about enough gold left in the subtreasury in New York to last the government forty-eight hours. The problem was to find means of reinforcing it immediately and of restoring public confidence in its continued integrity. Only by so doing could that vicious syphon be stopped which was pumping Treasury gold out into the pockets of hoarders and for shipment into foreign markets.

At this conference were the President, Secretary of the Treasury Carlisle, and Attorney-General Richard Olney, together with Mr. Morgan and an associate. After canvassing the situation Mr. Morgan presented his recommendation: Why not have the Treasury enter into a contract to buy gold coin as so much merchandise, with the understanding that a sizable part must come from abroad? Government bonds could be issued in payment. This thought was new to both Cleveland and Carlisle but both agreed that it was authorized by an existing statute. After some hesitation Cleveland gave his approval. The meeting carried on into the small hours as the parties worked out the details of the transaction.

Subsequent criticism by disgruntled silverite Congressmen of this conference with Morgan caused Cleveland at a later time to state: "I think it may here be frankly confessed that it never occurred to any of us to consult, in this emergency, farmers, doctors, lawyers, shoemakers or even statesmen. We could not escape the belief that the prospect of obtaining what we needed might be somewhat improved by making application to those whose business and surroundings qualified them intelligently to respond." ^a

Following the meeting in Cleveland's office, Morgan organized a syndicate which entered into a remarkable contract with the Treasury. The leaders of this group included the strongest interests in New York and London. Among them were J. P. Morgan & Co. and August Belmont & Co.

in New York with N. M. Rothschild & Son and J. S. Morgan & Co. in London. They agreed to sell the Treasury 3,500,000 ounces of standard gold coin of the United States, at least one-half of which must come from abroad. Deliveries were to run over several months. During this period

UNITED STATES GOVERNMENT 4 PER CENT. LOAN

\$62,317,500 NOMINAL CAPITAL,

PAYABLE BOTH PRINCIPAL AND INTEREST IN THE UNITED STATES

One-half of this Loan is reserved for issue in America.

The Bonds are redeemable at the pleasure of the United States Government after, but not before, the expiration of thirty years from the 1st February, 1895

The Bonds are issued under Authority of an Act of Congress approved the 14th January, 1875, and in accordance with an Act approved the 14th July, 1870, as amended by an Act of the 20th January, 1871, and under the terms of Section 3,733 of the Revised Statutes of the United States of America, whereby "The Secretary of the Treasury may purchase Coin "with any of the Bonds or Notes of the United States, authorized by law at such rates and "upon such terms as he may deem most advantageous to the public interest." The Secretary of the Treasury being of opinion that an emergency now exists in which the public interests require that Coin should be purchased with Bonds as provided by the above-mentioned Acts, has authorized the present issue. The Bonds are payable in both principal and interest in Coin and will bear interest at 4 per cent per annum payable quarterly, on the 1st February, 1st May, 1st August, and 1st November in each year. The principal and interest are exempt from the payment of all taxes or duties of the United States, as well as from taxation in any form, by or under State, Municipal or Local Authority.

Messrs. N. M. ROTHSCHILD & SONS,

AND

Messrs. J. S. MORGAN & CO.

Facsimile of offering notice relating to the European portion of the United States Government loan made by President Cleveland to replenish the gold reserve of the Treasury. The underwriting syndicate in the United States was headed by J. P. Morgan & Co., and August Belmont & Co., of New York.

Courtesy of J. P. Morgan & Co., Inc.

the syndicate agreed to "exert all financial influence and make all legitimate efforts to protect the Treasury of the United States against the withdrawals of gold pending the complete performance of the contract." Payment was to be made in United States Government 4 per cent bonds redeemable after thirty years.

This transaction was completed by June of 1895 by which time the Treasury had issued \$62,315,400 of bonds and had received therefore \$65,116,244.62 in gold coin. This figured out roughly to a price of 104.5 to the

Treasury, or an interest cost of 3½ per cent. The public offering price for the bonds was 112.25. The deal was later criticized on two points: that the Treasury was paid but a poor price for the bonds and that the syndicate made an inordinate profit. In this connection it may be noted that the 4 per cent bonds were payable in "coin." Both Cleveland and Morgan urged that Congress authorize a 3 per cent bond issue specifically payable in "gold." Congress stubbornly refused although as Cleveland later pointed out this would have saved the Treasury many millions of dollars. While the syndicate profit, most of which went abroad, was undoubtedly large, it must be recalled that the risks were substantial. The Treasury position was still precarious and there was no telling what inflationary adventures a silverite Congress might undertake. Moreover the syndicate had assumed other responsibilities.

The most unusual feature of the contract was the provision that the underwriters would utilize their influence to prevent the export of gold to Europe. The syndicate immediately brought into the deal all the major foreign exchange firms of New York, who agreed during the life of the contract not to draw on the Treasury for gold to be exported. "They proposed to sell in New York whatever drafts on London should be needed by the banking and mercantile community, and to meet the drafts in London through the use of their own credit on the London money market." ⁸ The arrangement was in effect an attempt to control all sterling-dollar exchange at a fixed price.

One naturally wonders why hardheaded men like Cleveland and Morgan ever abandoned their realism long enough to try such an undertaking. All business experience augurs against attempts to control any markets. In this case they had no alternative. Their backs were to the wall. If the Treasury had gone off gold the injury to the nation's credit and our business system would have been incalculable. Accordingly they chose a procedure that was risky in itself but which possessed the great merit of gaining time. It was like administering oxygen to a patient; it could succeed only if the general system of the patient could muster increased strength. In the end that is just the way it worked out.

Meanwhile Cleveland and the syndicate had some bad moments. For a few months the exchange situation was under control and all markets here experienced a speculative boom. Then in July a New York concern kicked over the traces and started selling sterling exchange below the syndicate price. By shipping gold to cover these drafts they made a large profit. They secured their gold by the old practice of presenting legal tender notes to the Treasury for redemption. The fat was in the fire. Exchange broke. Others joined in the game of pumping gold out of the

Treasury. The syndicate was forced to abandon its attempts to control exchange.

It was during these months of crisis in foreign exchange that an interesting incident occurred. It became important for Cleveland and Morgan to confer again. Another meeting in Washington would have brought the silverites in Congress around the President's head like a swarm of outraged hornets. By these militant but misguided zealots Morgan was considered the reigning Arch-Devil of the gold forces whose sinister aim was to enslave the farmer and the working man. While simply to be seen with him was an effective means of establishing bank credit, it was on the other hand political suicide. Now it so happened that Cleveland was a great fisherman. Accordingly he arranged a holiday on E. C. Benedict's yacht, *Oneida*. At the same time J. P. Morgan was cruising on the *Corsair*. Strange to relate, one evening the two yachts were found by purest coincidence anchored alongside each other in Gardiner's Bay in Long Island Sound. Cleveland and Morgan went into conference and the tender sensibilities of the silver Congressmen were preserved from outrage.

Through late 1895 and most of 1896 a nip-and-tuck struggle continued, with the constructive forces gradually assuming control. We succeeded in maintaining gold payments. Not only that, but we managed to put the Treasury in a strong position. Cleveland and Morgan could look back with satisfaction upon their work. The oxygen treatment administered during the first six months of 1895 had permitted the patient to gain the general strength needed for recovery.

Another factor which contributed to restore general confidence in our monetary affairs was the success of the Republican party in the national election of 1896. The paramount issue between Bryan and McKinley was the silver question. Bryan demanded free coinage of silver in the ratio of sixteen to one. Aligned with him were all the groups which had for years been pressing for silver coinage or inflation of the currency. It was at the Democratic National Convention of that year that Bryan concluded his peroration with the celebrated words, "We shall answer their demands for a gold standard by saying to them: You shall not press down upon the brow of labor this crown of thorns. You shall not crucify mankind upon a cross of gold."

In the campaign which ensued Republicans took direct issue on the basic question and declared unreservedly for the gold standard and time-tried currency policies. When McKinley won many people believed that the silver inflationists had been defeated on a clear-cut issue. In practical

effect this was true even though the silverites continued to mass their strength under the banner of free coinage.

Against a background of generally improving economic conditions a conclusive victory for the sound money advocates was achieved in the Currency Act of 1900. Under this law gold was made the standard; other forms of currency were to be maintained on a parity. Silver coinage was stopped but Treasury silver was to be used in redeeming legal tender notes of 1890. A gold reserve of \$150 million was established and made separate from the general fund. Even more important, the gold-siphoning tendency of legal tender resumption was curtailed by permitting contraction of circulation. Although Bryan and his silver battalions once again took the field in the national election of 1900, their cause was lost. The Thirty Years' War was won. The inflationists were routed. We had finally accepted those orthodox and conservative currency policies generally known as "sound money."

Other events took place about this time which assisted in consolidating the victory and in giving it lasting effect. From 1896 onward world gold production increased substantially. Great mines in South Africa and deposits in the Yukon began to pour forth huge amounts of the yellow metal. Application of the cyanide process added further to the supply. Concurrently there was a worldwide increase in the general price level. Thus growing accumulations of monetary gold and rising prices for goods and commodities added to the success of the sound money system as finally adopted in 1900.

That we were able to resist the pressure of the silverites and remain on a gold basis during the critical months of 1895 was due in great measure to the courage and hard commonsense of Grover Cleveland. In later reporting upon his part in these trying times he ended with the following comment:

I have attempted to give a detailed history of the crime charged against an Administration which "issued bonds of the Government in time of peace." Without shame and without repentance, I confess my share of the guilt; and I refuse to shield my accomplices in this crime who, with me, held high places in that Administration. And though Mr. Morgan and Mr. Belmont and scores of other bankers and financiers who were accessories in those transactions may be steeped in destructive propensities, and may be constantly busy in sinful schemes, I shall always recall with satisfaction and self-congratulation my collusion with them at a time when our country sorely needed their aid.^a

XXVI.

PANICS AND DEPRESSIONS

1873 and 1893

THE businessmen who carried on from the Civil War down to the opening of the twentieth century did not have to learn about booms and busts in a textbook. Their own experience was moderately full of such things.

Our adjustment from a war to a peace economy, coupled with unsettled conditions in England, brought on an economic crisis in 1866. Next, after five years of hectic railroad building and general expansion, we were struck with the panic of 1873. Eleven years later, in 1884, business was thrown off balance by trouble in our security markets. In 1890 economic conditions became again disturbed. Then over the next three years our system grew seriously inflated and we suffered an acute depression starting in 1893. For about forty per cent of the time, during a period of thirty years, business was seriously disturbed.

The business upset of 1866 proved short-lived. Recovery was prompt and the nation squared away for postwar expansion which assumed boom proportions within a few years. The procession was led by railroad building—particularly in the West. In the four years ending in 1872 we had added over 25,000 miles of new track. This created an inflated demand for iron and steel which was in turn reflected in many other industries. "There appeared to be no end to possible opportunities and profits in the industrial world, and new securities were created on a large scale, while prices of all commodities were unduly inflated."¹

We poured our own capital and much that was raised abroad into these new railroad projects. Large sums were also used in developing new farms. A great deal of this investment had no prospect of becoming immediately profitable. We were heavily discounting the future. As the boom psychology took control we greatly increased our imports of goods,

business volume expanded, and credit became inflated. The actions of both government and business in financial matters were characterized by a general laxity and recklessness. The public conscience was dulled by scandals such as the Gold Corner of '69, the Credit Mobilier charges, and by wild speculation in railway shares. The entire economic system was overextended. The bubble of prosperity had been blown up to the bursting point.

A FINANCIAL THUNDERBOLT.

SUSPENSION OF JAY COOKE & CO.

A CRASH IN STOCKS.

STARTLING FINANCIAL DISASTER—FAILURE OF THE GREAT GOVERNMENT BANKERS OF PHILADELPHIA AND THEIR BRANCHES IN THIS CITY AND WASHINGTON—THE NORTHERN PACIFIC RAILROAD TEMPORARILY CRIPPLED—TWO OTHER RAILROADS EMBARRASSED—FAILURE OF RICHARD SCHELL AND A RUN ON THE UNION TRUST COMPANY.

New-York, the financial clearing-house of the Republic, was shaken yesterday by the suspension of Jay Cooke & Co., one of the most prominent banking firms in the country, and of Richard Schell and Robinson & Suydam, well-known stock-brokers. The uneasiness which has been increasing in monetary circles during the past ten days culminated in a series of disasters the effects of which are already felt throughout the

News report of the event which opened the panic of
1873

New York Tribune, September 19, 1873

Then on September 18, 1873, out of a sky already somewhat overcast, a thunderbolt struck. Trading on the New York Stock Exchange was suddenly interrupted and from the rostrum the secretary read an announcement which strained credulity. The great banking house of Jay Cooke & Co. had suspended payment. While no one realized it at the moment, the panic of 1873 was on. A six-year depression had started.

The record of Jay Cooke serves to highlight conditions leading up to the catastrophe. On the basis of his Civil War government bondselling,

his firm, Jay Cooke & Co., was widely known and highly regarded. Casting about for opportunities after the war, he seized upon the ambitious plan of financing another Pacific railroad—the Northern Pacific. While this project had no government bonds as a subsidy, such as had been given to the Union Pacific, Cooke believed that his talents and reputation would make up the deficiency. Accordingly he undertook to finance the construction of this route from the Great Lakes to the Pacific. He planned to raise funds by selling Northern Pacific securities on a nationwide scale to innumerable small investors. He appointed many agents and applied all the pressure he could devise. In describing Northern Pacific bonds one of Cooke's advertisements stated:

The bonds are secured by a first mortgage on the road, its traffic and franchise, and on the entire land grant received from the Government. The rate of interest is seven and three tenths gold—equivalent to about eight and a quarter per cent currency. Believing the security to be ample and the rate of interest satisfactory, we recommend these bonds as a desirable investment. Holders of United States Five-Twenties and high priced corporate securities may materially increase both their principal and their interest income by exchanging for Northern Pacifics.¹

Much to Cooke's surprise his fellow citizens did not respond with enthusiasm. His bond-selling scheme fell flat. Nor was Jay Cooke, McCullough & Co. in London able to make a better showing.

In the meantime construction of the Northern Pacific was being pushed and money had to be found to buy rails, pay contractors, and acquire subsidiary lines. Cooke had gone all-out for what seemed to him a project of national destiny, entitled to support on a patriotic as well as a profit basis. Accordingly, when the sale of Northern Pacific bonds failed to produce funds, he began to put up money from his own banking company. General conditions deteriorated and before long Cooke was faced with the alternative of repudiating the grandiose scheme entirely and admitting its failure or of advancing the money of his depositors beyond the dictates of prudence. He chose the latter. In ordinary times he might have had a chance of succeeding. Neither he nor most of his contemporaries realized that the country was even then threatened by an economic tidal wave which was shortly to ravage our whole business structure.

Jay Cooke was not the only one who had a bear by the tail. Other banks and businessmen were engaging in the same kind of speculative railroad promotion. Cooke simply had the biggest bear. The New York Warehouse and Security Company had forsaken its regular field of operations to finance the Missouri, Kansas, and Texas Railroad. Kenyon, Cox & Co. of New York, in which the "Old Fox," Daniel Drew, was a partner, had

strayed from the innocent hobby of stock market juggling to endorse notes of the Canada Southern Railway.

As the year 1873 advanced storm signals began to fly. Merchants and bankers in the port cities noted heavy increases in our imports, far beyond normal fluctuations. Others doing business in the South and West found it necessary to increase credit terms from two or three months to six or eight. The fall and winter seasonal money stringency carried over into the early months of 1873. In May the city of Vienna and other continental centers were hit with a panic. Concurrently there was an extraordinary derangement in international payments in Europe as the Bank of France and the Bank of England financed the French indemnity payments to Germany. The sale of new securities in our markets became difficult, if not impossible. As fall approached there was an epidemic of defalcations and forgeries. Furthermore, those who recall the catastrophe of 1929 will be interested to note that at this point a famous banking house of London, Messrs. Glyn & Co., launched the "American Investment Trust"!

As usual there were few people who read these signs as danger signals. Even the most experienced observers were deceived. In April of 1873 we find one commentator remarking: "Every financial man can see how with these safeguards a general panic is almost impossible and will continue impossible as long as our banks are kept strong in reserve."³

When September arrived the tightening of money rates was accepted as seasonal. Then on September 8 the New York Warehouse and Security Company suspended payments, followed on the 13th by the failure of Kenyon, Cox & Co. At that particular moment, in commenting on the fact that government bonds had fallen only 3 per cent, the editor of *The Commercial and Financial Chronicle* said: "In this, as in other points we have noted, the thoughtful man will see many gratifying indications of firmness and strength in the financial situation."⁴

Hardly was this issue of the paper in the hands of its readers when there followed in quick succession:

September 18th, the dramatic announcement on the New York Stock Exchange that Jay Cooke & Co. had suspended payments;

September 19th, the failure of Fisk and Hatch, a securities house;

September 20th, the failure of Union Trust Co., National Trust Co., and National Bank of the Commonwealth;

September 20th, closing of the New York Stock Exchange.

The large New York banks bore the brunt of this financial storm. They were performing two functions. First, as local community banks they

extended accommodations to New York City businessmen. Second, because of the dominating position of New York both in foreign and domestic trade, they were acting as bankers' banks. Under the National Banking Laws, New York was a "central reserve" city and its banks accepted deposits from and held reserves for hundreds of banks in the interior of the country.

When trouble struck performance of the first function involved no insurmountable difficulties. Deposits of New York City merchants were only partially depleted. On the other hand fulfillment of the second function created a crisis of major proportions. The banks of the interior drew heavily on their deposits in the New York banks. This, of course, multiplied the pressure on these large institutions. In consequence the reserves of the New York Clearing House banks fell from \$80 million in August, 1873, to \$53 million in September. From the middle of September to the middle of October they lost 22 per cent of the deposits of individuals, 39 per cent of the deposits of other banks, and 65 per cent of their reserves. The effects permeated into almost every community. Yet we gained something in experience. We became aware of the lack of flexibility and cohesion in our banking system. It was this experience coupled with others later which promoted the adoption of the Federal Reserve System.

Defensive measures taken by the New York banks showed cool judgment and courageous teamwork. Had they not so acted the whole banking system might easily have come tumbling down. The first step was the decision by the New York Clearing House to issue certificates to its members. Essentially this involved pooling resources in a common cause on the theory that the strong must support the weak in order to prevent the gradual collapse of the whole system. A committee of five bankers accordingly was appointed to accept the deposit of securities and bills receivable from member banks and to issue clearing house certificates for 75 per cent of the value of the bills receivable or 100 per cent of the par value of bonds deposited. Thus by pledging certain assets and paying interest at 7 per cent a member bank could secure clearing house certificates which might be used to pay balances owed to other members. During the next few months certificates aggregating around \$27 million were issued. The committee was given the further power to assess members for legal tender notes in order to equalize bank reserves and to permit rapid relief of a bank upon which a run was threatened.

This plan successfully dealt with the situation in New York, yet it did not stop the flow of withdrawals by the interior. Consequently the New York banks were forced to adopt a measure of partial suspension. Country banks were denied currency withdrawals but an individual depositor

could go to the cashier's window of a New York bank in person and secure cash.

The crisis in its financial aspects was quickly over. By November of 1873 the Loan Committee of the New York Clearing House was able to discontinue the emergency measures. Their plan of concerted action, pooling of reserves, and use of temporary clearing house certificates had proven itself. It was to be utilized subsequently whenever a financial storm broke.

In business, however, the depression was severe and long enduring. Both agriculture and labor suffered extensively and in 1877 we experienced serious railroad labor riots. "This long depression was marked by tens of thousands of failures, the default of more than a hundred railroads, a collapse of prices and appalling poverty and misery."⁵

The condition lasted in varying degrees of severity until 1879 when, after resuming specie payments, we were blessed with a heavy demand for our grain by England and Europe. Business picked up briskly on all fronts. We had several years of excellent prosperity until 1884, when trouble developed out of a clear sky. Europe suddenly began to sell American securities and claim gold. This action may have been fostered by a decline in our volume of general business after five years of prosperity. In any event, gold shipments to Europe for March and April, 1884, totaled over \$33 million. Then in May the stockmarket broke wide open. The securities firm of Grant and Ward suspended. This event attracted more than usual interest because former President Grant was a victim. He had embarked in a business for which he was ill-equipped and in which he was forced to rely on the judgment of others. This panic was mostly financial. General business did not suffer as in 1873.

The crisis of 1890 was also largely confined to the security markets where for a time its effects were severe. The years 1885 through 1889 had been good and the volume of trade in 1890 was high. We had excellent crops in 1889 whereas those in Europe were poor. But a speculative boom began to develop in 1890. Our markets were reflecting those in London where a positive orgy of speculation was in progress.

It was during these years (1885-1890) that England may be said to have discovered the Argentine. With the banking firm of Baring Bros. acting as the bellwether, heavy investments were made in that country. Suddenly nature threw an economic monkey wrench into this pretty scheme of things. The 1889 wheat crop in Argentina was a failure. Unfortunately the momentum of speculative fever in London was so great that this warning was brushed aside and the final surge of Argentine speculation swept forward until November, 1890. Then, almost over-

night, fear of the Argentine situation seized the collective attention of British business and the securities of that South American country became questionable collateral. Baring Bros., regarded in England almost as an impregnable institution, like Gibraltar and afternoon tea, failed with liabilities of about twenty-one million pounds.⁶ The London security markets suffered seriously.

As this blow struck in England we in the United States were again in a vulnerable position. Part of our heavy imports of merchandise through 1886-1890 had been financed by export of American securities. When the Argentine crisis broke upon startled English investors, they began to convert into gold. American securities were dumped wholesale on the New York market which was itself already overextended. The resultant collapse was acute. But the crisis in the United States did not last long. Our exports and business in general were doing well. The panic was a financial one. It was in fact only a curtain raiser to what was to follow.

For the next two years the world witnessed a great drama of inflation in the United States. The Treasury, under the compulsion of the Silver Purchase Act of 1890, continued to pour out legal tenders. In the last six months of 1890 some \$100 million was added to the currency in circulation. Under the Silver Purchase Act about \$50 million new legal tenders would be put out each year. This was the medicine that the easy-money crowd had demanded. It was poison in other quarters.

As inflation of the currency mounted, so did suspicion of its integrity. Many people, especially Europeans who could appraise our situation objectively, thought that our western inflationists would ride the nation to ruin on a sea of paper money. Gold, physically one of the heaviest of metals, is in economics the lightest. It took flight as inflation of the currency was carried forward. The last two years of the Harrison administration were spent in a desperate battle to maintain the gold reserve.

Differing from 1873, this storm of 1893 produced the most acute distress in the West, because its people had given themselves over completely to the speculative orgy. Almost all of the 158 national bank failures were in the West and South. This time it was the interior of the country which was forced to undergo the most drastic deflation. The Plankinton Bank of Milwaukee went down, as did the Chemical National and Columbia National in Chicago. But on the whole the banking system in Chicago bore up remarkably. This was due in great measure to the courageous integrity of the business leaders. When long lines of anxious depositors formed at the Chicago banks to withdraw currency, P. D. Armour and Marshall Field went to the throngs in person to announce that cur-

rency would also be paid out at the Armour office and at the Marshall Field store. Direct action of this kind is often worth a vault full of gold.

Meanwhile we had again overbuilt the railroad system and had heavily overborrowed upon it. As business volume shrank under the impact of credit inflation, many roads were unable to meet operating expenses, let alone pay interest on their debts. The result was an epidemic of railroad failures. By the latter months of 1895 there were in receivership (both old and recent) some 169 railroads operating over 37,000 miles of track. These companies represented an aggregate capitalization of about \$2.4 billion. Among the larger insolvencies were the Erie, the Northern Pacific, and the Santa Fe.

Tragic as were the consequences of such troubles, they served to bring home the merits of sound business management. Rich rewards were available to those who in the preceding years of prosperity had preserved integrity of judgment and self-restraint in the use of credit. Thus James J. Hill, having completed his Great Northern Railway in January, 1893, was able to press forward without embarrassment while his competitors, the Northern Pacific and Union Pacific, were forced into bankruptcy. Similarly the canny steelmaker, Andrew Carnegie, employed the depression years to modernize his plants. John D. Rockefeller chose these discouraging times to buy up iron-ore properties in the Mesabi Range. Shrewd investors acquired profitable holdings of railroad securities as bankruptcy liquidation squeezed the water out of overcapitalized ventures.

The financial crisis of '93 was severe but short-lived. The depression in trade and manufacture, however, was prolonged. There was widespread unemployment and a great deal of social unrest. Coxey's Army of disgruntled men without jobs marched on the Capitol. The Pullman strike occurred in Chicago, and riotous interference by strikers with transportation operations caused President Cleveland to send federal troops into the area. Industrial readjustment was protracted and painful.

During these years we were learning the hard way—through bitter and often cruel experience. We discovered that currency tinkering was disastrous. We learned that inflation of the currency as a cure-all for industrial ills did more harm than good. We found that our banking system was inadequate to provide for seasonal and unusual fluctuations in demand for credit; that heavy European investment in our securities rendered our markets and gold reserve vulnerable. Our sufferings were not in vain. Through them we discovered the essentials of a stable currency and an adequate banking system.

XXVII.

COMPETITION PROMOTES COMBINATION

Big Business and Trusts

As railroad facilities multiplied and as manufacturing expanded, competition increased in intensity and ruthlessness. All business was growing. Nevertheless, no matter how rapidly old markets were expanded or new fields created, there was always this pressure to divide and redivide the total.

Wide-open competition was, of course, an ideological heritage with Americans. Yet while a moderate amount of competition is stimulating, an excess is agreeable to no one and is bound to bring a search for relief. So in the years 1865 to 1900 we find businessmen engaging first in cut-throat competitive practices and then, in a second phase when things had become intolerable, seeking various means of cooperation.

The first cooperative efforts were pools and loosely drawn associations. One of the earliest in the railroad field was attempted by the Chicago & Northwestern, the Rock Island, and the Burlington. Under their arrangement one-half of the earnings from certain traffic was contributed by each road to a common pool, the theory being that such mutual sharing would discourage competition and prevent rate cutting. In the industrial field there had been a pool of cordage manufacturers as early as 1860. It was not, however, until the 1870's and '80's that the movement became widespread. In those years many associations were formed for the purpose of mitigating the effects of competition. They operated in various ways. The Gunpowder Manufacturers' Association attempted to maintain prices. The Kentucky Distilleries' Association regulated output. The Standard Envelope Company pooled both expenses and profits. One of the most successful of these arrangements was in the meat-packing business, the so-called "Veeder Pools" named after a lawyer for Swift & Co., Albert H. Veeder. Under this plan representatives of Armour, Swift, and Morris

met every Friday to allot among themselves shipments for the succeeding week of meat to various consuming centers. Fines were imposed for breaches of these schedules. On the whole these pooling or association methods were not particularly successful. Like the "gentlemen's agreements" of later years, they were effective only while every member exercised self-restraint—which usually was not for long. Much more effective in limiting cut-throat competition was the method of consolidating competing companies. Under this formula control of members was absolute. The idea appealed to all who had found the pools exasperatingly futile.

The most extensive area of competitive conflict involved the railroads. Their rate wars, pooling agreements, and preferential tariffs, both public and secret, had a far-reaching effect upon all business. The greatest of these battles raged between the New York Central and the Pennsylvania. This was quite natural because the country's largest flow of railroad traffic was that moving between the Midwest and the East Coast.

In 1867 Commodore Cornelius Vanderbilt at the age of 73 had purchased the New York Central and in 1869 united it with his Hudson River road to form the New York Central and Hudson River Railroad. At the same time, he had noted with interest, the Pennsylvania Railroad had acquired the Pittsburgh, Fort Wayne and Chicago, thus providing a through line from Philadelphia to Lake Michigan. The lusty Commodore countered with the acquisition of the Lake Shore and Michigan Southern in 1873. As a result of these moves, New York and Philadelphia each possessed a through railroad line to Chicago. For the next thirty years competition was to be keen.

This not only involved warfare between these main systems but also developed into a conflict to prevent newcomers from barging into the business. During the depression years, 1873–1878, ambitious railroad projects lay dormant. With recovery, however, an optimistic exuberance developed and, continuing to the early 'nineties, the country witnessed another splurge of railroad building. Within the years 1878–1893 some 82,000 miles of main line were added to the national total, an increase of about 100 per cent.

Two of these new railroads directly threatened the New York Central System. In 1882 construction was started on the New York, Chicago and St. Louis or Nickel Plate which would compete with the Lake Shore. This problem was disposed of in the grand manner—purchase by the Central interests. The second became for a while a serious threat to the Central. This was the construction of the West Shore Railroad from Weehawken to Buffalo in the years 1881–1884. Associated here were Jay Gould and George Pullman. The former could contemplate with satis-

faction what a thorn in the Vanderbilt hide this route so close to the Central would be. Pullman was not unmindful of the fact that the Central used sleeping cars made by his rival, the Wagner Company.

In the meantime, on another scene events were building up also to center interest on the West Shore. Down in Pittsburgh, Andrew Carnegie, the nation's leading steelmaker, had got into a knock-down, drag-out fight with the Pennsylvania Railroad. There being no effective competition on freight out of that city, the Pennsylvania was charging Carnegie all the traffic would bear. On occasion he paid a higher rate to ship steel from Pittsburgh to the East Coast than a competitor did from Chicago. One cannot do that to a Scot for long.

Accordingly Andy prevailed upon William H. Vanderbilt of the New York Central System to join in a new rail project in Pennsylvania from Reading to Pittsburgh. This, of course, was a direct invasion of the Holy Land and a rude desecration of that inner sanctum, the Main Line. Did not these Unbelievers know that the monopoly of the Pennsylvania Railroad in Pennsylvania was as sacrosanct as Penn's Charter? The Bedouins of Chestnut Street and Rittenhouse Square took to horse.

By this time the stock panic of 1884 was in full swing. The new West Shore Railroad had just started operations and had almost immediately gone into receivership. Suddenly, to their dismay, the Vanderbilt-New York Central group discovered that leading stockholders of the Pennsylvania had acquired a heavy interest in West Shore bonds. By virtue of such holdings they might even dictate the terms of reorganization.

This was the situation. The New York Central people were projecting a new railroad into the heart of the Pennsylvania territory. The Pennsylvania interests were about to secure control of the West Shore, a close and direct competitor of the Central. In effect, each of these giants held a knife at the other's throat. Obviously something had to be done or the profits of both would disappear like a snowball in Satan's back yard.

The climax came when J. Pierpont Morgan, possessing the confidence of both sides, invited representatives of each for a cruise up the Hudson on his yacht, the *Corsair*. Here, on the secluded, comfortable afterdeck the embattled railroad warriors talked out their grievances and came to agreement. The Vanderbilt group would abandon its foray into Pennsylvania territory; the Pennsylvania would allow Morgan to engineer a reorganization of the West Shore which would place it under Central control. Andrew Carnegie was left to the brotherly love of the Pennsylvania Railroad interests. As events turned out, he was equal to the occasion.

While these moves were being played on the field of grand strategy, a continuous cut-throat warfare was being carried on as to rates and the

securing of business. The depression years following 1873 were lean and the railroads were so hungry for traffic that no means were spared in going after it. Competition was particularly keen between the trunk lines. Passenger rates were cut as low as \$13 for the trip from New York to Chicago. Mr. Cassatt in a later year testified that the Pennsylvania found itself actually paying for the privilege of transporting the oil of one customer—such was the effect of rebating.

The modern conception of the railroad as a common carrier had not yet developed in the public mind. Most of the roads had been built with private capital, through the energy and initiative of businessmen. Their operation was, therefore, thought of much in the same light as manufacturing or trading companies. Moreover, there existed in the early period great public pride in the accomplishments of the new railroad managements. When the glistening, white-painted *Fast Mail* in 1875 made the trip from New York to Chicago in the sensational time of twenty-seven hours the whole country was thrilled. Therefore, as the roads went out after business with every competitive device known to man, there were few who criticized their ruthless methods. The public conscience had not developed to the point where it could say, "while these companies are owned by their stockholders, they are by their nature charged first with the public interest."

The policy of the roads in determining rates was to charge as much as they could get. This meant that shippers depending upon one railroad found themselves in a weak position. For example, Pittsburgh and vicinity had but one real outlet, the Pennsylvania. Accordingly they were at the mercy of its ratemakers. On the other hand Cleveland and Buffalo were served by competing railroads. A shipper could switch from one to the other if he did not think he was being fairly treated. Then there was the discrimination in favor of the long haul as against the short haul. Having only recently become through trunk lines, the big roads were primarily interested in developing this type of business. Hence, the Pennsylvania, the Central, and the Erie would frequently favor shipments from Chicago to the East Coast as compared to those from intermediate points.

Inequitable as these basic policies were, there was another practice that made them seem like positive virtues in comparison. This was the system of special rates, rebates, and drawbacks. Under these procedures competing shippers of identical products for the same haul were treated differently. The large were favored over the small. The greater the volume of shipping, the lower the rates would be. The rebate was a repayment by the railroad to a shipper of part of the freight already paid. Because the original shipping documents were written at the published rates it

was made to appear that these were actually being charged. The net rates were wholly arbitrary.

The drawback, less frequently employed but even more iniquitous, was a repayment of a general nature made by the road to a shipper at the end of each month or settlement period. The whole system of rate making was in a chaotic state. The objective of the railroads was to get business. It would be secured at published freight rates if possible. If not, the necessary concessions would be made. The contract was regarded as solely one between the railroad and the shipper. That the practice favored the strong and penalized the weak was passed over as being an inevitable result of a competitive economy.

It takes no second thought to conclude that such ratemaking policies had a marked effect on all business. Freight costs are a substantial portion of the total costs of manufactured goods. One can hardly imagine a more effective incentive to consolidation and concentration. This condition caused businessmen to think in terms of "bigness" and to centralize their shipping. It fostered the advent of Big Business and was in a measure responsible for the growth of our large manufacturing centers.

There was one businessman in particular for whom the railroads did not have to draw diagrams in order to illustrate the opportunities presented by these rate making policies. As a refiner of oil on a small scale in Cleveland, John D. Rockefeller determined to secure these benefits by building up larger shipments than his competitors. By consolidating production he would also gain from reduced manufacturing costs. Such plans, implemented by the rare business qualities of Mr. Rockefeller, were to produce within a period of less than twenty years a national monopoly in oil refining, the nation's first "Trust," and one of the world's greatest fortunes. No one benefited more from railroad rate discrimination than John D. Rockefeller and his Standard Oil Company. However, the game he played was open to all. He and his associates simply had the jump on their competitors in a race in which the early lead meant everything.

A key to Rockefeller's attitude toward the railroads may be had from a paragraph in a letter which he wrote in 1868 to his wife in Cleveland while he was in New York on business:

"We were sent for by Mr. Vanderbilt yesterday at twelve o'clock but did not go. He is anxious to get our business & said he thought he could meet us on the terms. We send our Card by the messenger, that Van might know where to find our offices . . ." ¹ Here was an unknown, strip-ling oil refiner from Cleveland telling the great Commodore Vanderbilt that if he wanted to do business he could call at the Rockefeller offices.

Thenceforth Rockefeller and his associates were to turn this competitive railroad situation mightily to their advantage.

In 1869, some six years after Rockefeller had taken up refining, the firm of Rockefeller, Andrews & Flagler with a production of 1500 barrels per day was the largest of a group of small refiners in Cleveland. It was known for careful operation, good management, and aggressive business-getting. The field was highly competitive. A small refinery could be started for an investment of about \$10,000. All told there were some twenty-six in Cleveland alone. It was an example par excellence of a small businessman's industry. Production methods were crude, costly, and inefficient. The oil refining business was centered in four areas—the Oil Regions in Pennsylvania, Pittsburgh, the eastern seaboard, and the city of Cleveland. The latter had the largest capacity.

As he appraised the situation in 1870 Rockefeller drew certain conclusions. While many conservative businessmen looked askance at oil refining as not only speculative but downright wild and woolly, he foresaw a constantly growing world market for petroleum products. There were, of course, too many refineries and too much haphazard operation. But these conditions created the opportunity. By concentrating production he could secure larger freight rebates and achieve operating economies. He would need able men and much money. He thereupon adopted a business formula to which he devoted all his energy: *Strong Management Plus Ample Capital Plus Concentration of Production Equals Success.*

As to management, his firm was already outstanding. Andrews was an excellent practical refiner. Flagler and Rockefeller were both good businessmen and complemented each other nicely. In those early days they were heavy borrowers of money and worked the banks for all their credit would stand. Other experienced men were brought in year by year until the business world marveled at the ability of this man Rockefeller to secure strong men and weld them into a team. Looking back at his record in securing the support of Flagler, Harkness, Colonel Payne, Archbold, Lockhart, Pratt, and others, John D. in a rare piece of understatement was to remark, "I have always had as little as possible to do with dull business men."²

In 1870 the business was incorporated as the Standard Oil Company of Ohio with a capital of a million dollars. This would permit greater flexibility of operation and provide the means for buying out competitors. The years 1870 and 1871 were poor for the country. In 1871 practically all refiners were losing money. There was too much production and there were too many refiners. Furthermore the railroads were cutting each other's throats in a damaging rate war. Out of these circumstances was

born a plan that flagrantly outraged public opinion—the South Improvement Company.

The part which various persons played in this enterprise is not clear. When the scheme was unmasked the protestations of those who called themselves innocent could be heard from coast to coast. In any case we know that there were involved officials of the Pennsylvania, Lake Shore, and Erie Railroads as well as certain leading oil refiners, among them John D. Rockefeller of the Standard Oil Company of Ohio.

The plan was simple. The self-selected refining group would assure the railroads of a certain amount of traffic to be split 45 per cent to the Pennsylvania and 27.5 per cent each to the New York Central and the Erie. Public railroad freight rates on oil were to be raised. From these schedules, however, the refining group was to get a liberal rebate in the first instance. Then the really iniquitous provision came in. This select group was also to receive a large drawback from the high public rates which their competitors were to be charged. Such scheming of course could not be kept secret. The truth came out in dribblets. The freight differentials were such that an independent could not compete with the self-chosen few. It was a program of Rule or Ruin. Later its proponents explained, with poker faces, that they expected to invite all refiners to join.

At approximately the time this plot was being cooked up (1871-1872) Rockefeller was busy in Cleveland. He had started to work on the concentration component of his formula. Of course what everyone now would like to know is just how much the threat of the South Improvement Company was used to compel competitors to sell out. Obviously if they believed that scheme was going to work, to continue as independents meant disaster.

John D.'s first move of consolidation was characteristic. He bought out his strongest Cleveland competitor—Col. Oliver H. Payne of Clark, Payne & Co., using Standard Oil stock in payment. Having secured his most formidable Cleveland rival, the others were willing to listen, especially as local bankers and railroad men backed up the Rockefeller plan. Within a few months twenty-one of the twenty-six Cleveland refiners had sold out to Standard, most of them choosing to take cash instead of stock. The weakest plants were scrapped but Standard was left with a production of 10,000 barrels per day and an absolute monopoly of the refining business in the country's leading refining center.

This record has precipitated much controversy. Ida M. Tarbell believed that Rockefeller had directly used the threat of the South Improvement Company, coupled with support from its railroad sponsors, to force Cleve-

land refiners to sell out and that most of them did not want to sell. A sort of "your company or its life" threat.

Others have taken a less critical attitude, pointing out that basically there was too much refining capacity and that in view of the railroad rebate practice what Rockefeller proposed was plainly realistic. Furthermore, the excellence of the Standard management was beginning to be recognized. However, most people today utterly condemn the scheme of the South Improvement Company and John D. Rockefeller for having had anything to do with it. Even his ardent admirers can only see in it a serious mistake by one noted for not making many.

When word of the South Improvement Company plan was received in the Oil Regions, riot and insurrection broke loose among the crude oil producers. The thing could not stand the light of day and within several months the ambitious scheme had blown up. The select few, both railroad men and refiners who had hatched the plot, now left the structure without waiting to use normal exits. Responsibility was disclaimed. The South Improvement Company was a dead goose.

The condition of excess production and refining continued. Competition was still so acute that both refiners and producers tried to abate it. The National Refiners Association was formed and included among its members about 80 per cent of the industry. In the oil fields the Petroleum Producers' Association was organized. The theory was that both the production and the refining of oil would be cut back until a practical balance was attained between production and consumption. These loosely organized groups were in no sense effective. In the production of crude, there was no way to regulate wild-cat drilling. The organization of refiners and that of producers gradually fell apart.

In the light of these developments John D. and his associates came to certain conclusions. The concentration part of their success equation was working all right with the companies they had already acquired. They must not allow themselves to be diverted by loosely drawn schemes of association, all of which had proved to be failures. Experience showed that the only way to organize the industry was to control it. To control it, purchase of competing elements was necessary. To Rockefeller's mind all this was simple arithmetic.

Having acquired dominion over Cleveland's refining industry through purchase and consolidation, he now embarked on the more ambitious plan of applying this formula on a national scale. He bought out refiners in Pittsburgh and New York who at once began to work as his agents in acquiring other companies. Some of this was done secretly, so that at

times Standard Oil ownership was not disclosed for months. This caused suspicion and resentment among the independents.

In these early years Rockefeller would have nothing to do with the production of crude oil. He was content to let other people engage in the speculative drilling of new wells. Properly he sensed that there was no problem in securing his raw material. He concluded—wisely—that unrestrained competition in drilling wells and producing crude was for years to be the curse of that end of the business. In the refining field he saw more promising opportunities for his talents as an organizer and efficient operator.

The year 1874 witnessed further efforts to overcome competitive conditions. Once again the oil carriers entered into an arrangement with the refiners. The Pennsylvania was to get 50 per cent of the traffic and the Central and Erie 25 per cent each. The big refiners were to act as "eveners." Rates were raised but Standard won a victory by securing the same overall rate for shipping crude oil from the producing regions into Cleveland and then sending the refined product on to New York as the Oil Region refiner paid solely for shipment of refined to New York.

The growing power of Standard Oil caused concern to many, not the least of whom was Tom Scott of the Pennsylvania Railroad. As head of that great system he was a monarch unadjusted to knuckling under to the shippers of freight. In the noncompetitive area of the Pennsylvania, Scott did not negotiate with shippers—he simply told them what, when, and how much. Rockefeller did not seem to get the idea. Furthermore Scott could see a growing challenge from Standard because, by controlling refiners in both Pittsburgh and New York, it could throw its freight business either to the Pennsylvania or to the Central or the Erie. Scott and his railroad associates in 1877 decided to take the offensive with a sudden raid into enemy territory. The Empire Transportation Company, a controlled satellite of the Pennsylvania Railroad, broke into the refining business by constructing refineries at Newton Creek, Long Island, Philadelphia, and Communipaw, New Jersey.

Unfortunately for Scott he had engaged a warrior more skillful and ruthless than himself. Rockefeller cancelled his contract for shipping over the Pennsylvania, ordered a fleet of new tank cars, and procured freight rate reductions on the Erie and Central. Finally, to make the going hard for the Empire-Pennsylvania refineries, he cut the price of kerosene.

Scott, of course, was forced to meet these new freight rates and found himself losing money on much of his oil business. Then the Pennsylvania was hit by a general rate war among trunk lines. To cap the situation, there came the disastrous railroad strikes of '77, which were particularly

damaging to the Pennsylvania. Riots in Pittsburgh were so serious that the militia was called out, fired on the strikers, and killed a score of men.

The supposedly invulnerable Pennsylvania Railroad was really staggering under the impact of these events. Scott and Cassatt were forced to seek a truce. Accordingly a deal was worked out whereby the Pennsylvania consented to Rockefeller's buying the Empire pipe lines and refineries. Thereafter that great railroad monarchy was to stick to the railroad business. The scalp of the redoubtable Tom Scott was dangling for all to see from the war belt of that lean, cold-eyed warrior from Cleveland.

During these years Rockefeller and his associates were using their shipping power for all it was worth to force from the railroads concessions not obtainable by their competitors. All sorts of devices were used, both secret and public. It has been estimated by one authority that in the years 1877-1879 the independents paid \$1.445 per barrel and Standard Oil only 80¢ for shipping refined oil from either Cleveland or Pittsburgh to the Atlantic Coast. "The Standard not only had a giant's strength but was using it with the tyranny of a giant." *

It must have seemed to the railroads at this time that everything was going against them in the field of transporting oil. Nor could they have failed to note that no matter what the development Rockefeller always came out stronger than ever. Take the case of the technological revolution involved in long distance pipe-line transportation. One of the many people upon whose toes the Pennsylvania Railroad had trod was David Hostetter. He had attained fame and not a little coin of the realm in purveying to dyspeptic fellow citizens a specific known as Hostetter's Bitters. He became interested in oil and to circumvent the Pennsylvania Railroad projected a three-inch pipe line to connect the Oil Regions with the B & O Railroad. This was the trail blazer in what might be called trunk line operation as distinguished from the already well-developed system of short collecting lines. It was called the Columbia Conduit Pipe Lines and in 1877 was acquired by Standard Oil.

Following this sale three practical operators, Messrs. Benson, McKelvy, and Hopkins, retired from Columbia and started to promote another trunk pipe line. They projected one from Bradford field to connect at Williamsport with the Philadelphia and Reading Railroad for delivery on the East Coast. Technical direction of the enterprise was in the hands of Herman Haupt who had been chief engineer in building the Hoosac tunnel. Hardly had construction begun when they encountered the hostile opposition of both the Pennsylvania Railroad and the Standard Oil Company. These little Davids with negligible capital resources were in no

sense pikers. They had taken on at the same time not only one Goliath but two.

In building their new pipe line everything had to be planned secretly. To forestall them the Standard bought a right of way to cross the projected one. Haupt then resorted to fictitious surveys in order to throw the giants off his trail. He crossed under Pennsylvania Railroad tracks only to have the pipe torn up. When apparently completely stopped he laid his pipes in an old creek bed. Then Haupt encountered technical problems. Pipe laid on the surface in cool weather would, under the direct rays of the summer sun, expand into huge coils which arched into tree tops, looking for all the world like some huge snake. In spite of all their difficulties these hard-hitting independents won through. The Tide Water Pipe Company had laid a six-inch pipe line a distance of 110 miles to its destination on the Reading Railroad.

On the day of first full-length trial in May 1879 there was much excitement. Would the pumping equipment be sufficient to push the oil up and over the 1900-foot hump in the mountains? Success was theirs and the first oil gushed out at the Williamsport end amid great rejoicing. By this new route, part pipe-line and part railroad, oil from the Bradford field could be delivered to independent refineries on the East Coast at a freight cost lower by half than the railroads were charging. General Haupt and his Tide Water associates had won a signal victory over both the Pennsylvania Railroad and the Standard Oil Company. That, however, was the smaller part. They had inaugurated a new era in oil transport.

No one recognized the significance of this event better than Rockefeller. At once he began another trunk pipe line from the Bradford field to the coast. Meanwhile the Tide Water project was pushed through to eastern Pennsylvania. This latter move involved raising about two million dollars of new capital. Benson of Tide Water was rebuffed by various bankers until he encountered George F. Baker of the First National Bank of New York. Baker organized a syndicate to sell \$825,000 first mortgage bonds at 90, followed by \$1,375,000 loan certificates which not only carried interest but shared dividends with the common stock. The proposition must have looked good because in spite of mysterious efforts to discredit Tide Water, Baker and James R. Keene took about \$500,000 of the underwriting themselves. By 1911, they had received something over 2000 per cent in dividends and possessed an investment with a principal value of over fifteen times what was paid for it.

The effect of all this was that the railroads lost out substantially on the transportation of crude oil. The battles among themselves had been in vain. Again Rockefeller came out on top. He had gone in extensively for

building the new pipe lines. By 1882 it was estimated that some 75 per cent of all crude oil went out of the Oil Regions by pipe line. Later Rockefeller and the Tide Water crowd arranged a truce which divided shipments of crude to the East Coast on a basis of 11.5 per cent for Tide Water and 88.5 per cent for Standard.

While all this was going on Rockefeller and his associates were acquiring more refineries in the East. At this stage a legal problem began to assume disturbing proportions. Except for an occasional special charter to railroad companies, the charters granted by the various states did not permit ownership by one corporation of the stock of another corporation. Standard of Ohio had no legal authority to own stock in a New York corporation. In other states, as a foreign corporation its operating privileges were circumscribed. However, the whole philosophy of John D.'s operations was predicated upon the idea that this Ohio body would be the sun around which all other planets would revolve. Something had to be done. At any moment the actions of Standard Oil of Ohio in directing the affairs of business units in other states might be challenged in the courts.

Accordingly some of the best legal minds in the country were put to work. They evolved the "trust" procedure which was to bring more public attention to Rockefeller than anything else and give the country a handy name for designating all combinations of big business. From this development, trust began to be spelled with a capital "T" and came to signify in the public mind a sinister combination of business interests for the purpose of attaining a monopoly. In the law a trust had always been an instrument of benign intent and respectable reputation.

The scheme as ultimately worked out was simple. It also proved to be effective. A trust agreement was drawn up which provided that nine trustees would hold the stocks of all the companies, no matter where they were located. The stocks of the various units were delivered into the custody of the trustees who in turn issued their trust receipts. The lawyers advised that by this plan the trustees could legally vote the stock of the operating companies and thus exercise complete legal control of corporations in the various states. They could collect dividends from the operating units and either hold them for or pay them to the holders of trust certificates. This trust plan was matured between 1879 and 1882.

The nine original trustees were John D. Rockefeller, Oliver H. Payne, William Rockefeller, Jabez A. Bostwick, H. M. Flagler, William G. Warden, Charles Pratt, Benjamin Brewster, and John D. Archbold. These men met every morning at their New York office and directed the affairs of this petroleum empire. Some fourteen subsidiaries were wholly owned;

about twenty-four partially owned. It was later estimated that in this manner the nine men with John D. at the head of the table controlled 90 per cent of the refining and pipe-line business of the country.

Meanwhile "Trusts" and comprehensive consolidations were formed in other industries. A marked change was taking place in our economy. The period of ruthless competition among innumerable small companies was giving way to one wherein large concerns tended to dominate various industries. Big Business was crowding out Little Business.

As a result of growing alarm over this trend, President Benjamin Harrison urged the passage of a federal statute designed to impose limits on monopoly and preserve conditions of open competition. Accordingly in 1890 Congress enacted the Sherman Anti-Trust Law. Under this Act contracts, combinations, or conspiracies in restraint of interstate commerce were declared to be illegal. Several of the states also passed laws of similar purpose. At the outset these enactments had little practical effect. The movement toward concentrated business control continued.

The turn of the century witnessed the climax of this spectacular development in American industry. In 1899 the State of New Jersey passed a General Corporation Act which permitted the incorporation of holding companies without special legislative action. Many large companies accordingly took out New Jersey charters. Then in 1901 occurred a sensational corporate combination. J. Pierpont Morgan formed the United States Steel Corporation. It was a striking culmination of the whole movement—a sort of mastodonic consolidation of consolidations.

All the time public opinion was becoming increasingly alarmed. Widespread feelings of hostility grew against large combinations and certain big corporations. They were all popularly referred to in common terms—the Oil Trust, the Sugar Trust, the Beef Trust, the Tobacco Trust, and so on. This gave President Theodore Roosevelt and then his successor, President Taft, an opportunity to challenge the growing power of these business organizations during the years 1902-1912. Prosecutions were carried on under the Sherman Anti-Trust Law. As a result of final adjudications by the United States Supreme Court several of the larger combinations such as the Standard Oil Company and the American Tobacco Company were forced to dissolve. Thus the Sherman Act came to fulfill in a moderate degree the expectations of President Harrison when he proposed a law to maintain our traditional conditions of free competition.

Although the giant Trusts were curbed, this did not mean that the trend toward Big Business had stopped. On the contrary it continued and developed over a broad front. In many lines technological and managerial considerations were impelling the creation of large producing and dis-

tributing units rather than small ones. In this way more goods could be made available to more people at less cost. Industrial concentration in the twentieth century became a lever by which we raised our standard of living to higher levels. Application of the Sherman Act has, however, served to restrain the worst abuses of this new power in our economy. Again we find principles which set off the American system. In Europe where there has been no such restraint powerful combinations and monopolies have gone unchecked. This has ossified business, retarded production, and given a powerful incentive to socialization.

THE BIRTH OF MODERN STEEL

THE age of steel did not begin for us until after the Civil War. Up to that time steel as we have come to know it was not commercially produced. The processes for refining ferrous metals had remained much the same for generations. Stated in the simplest terms, there were just three of these products—cast iron, wrought iron, and the very costly crucible steel.

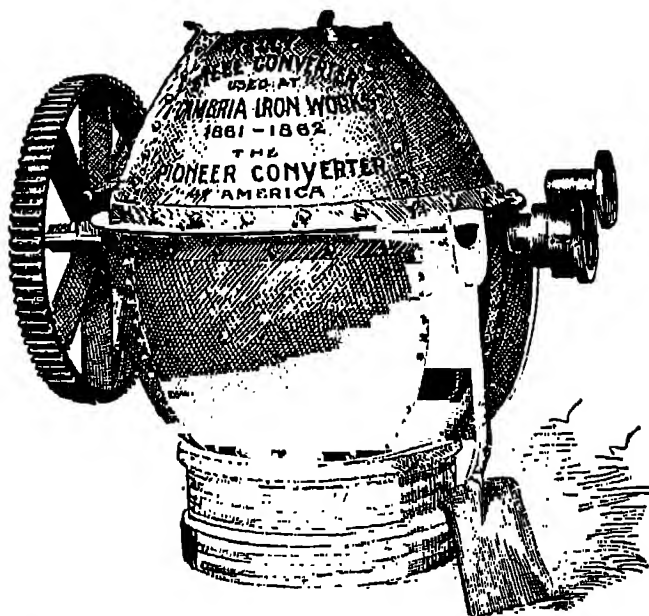
Cast iron was cheap and easy to make but had the defects of being brittle and lacking in malleability. Its use under conditions of great stresses involved castings of awkward and bulky proportions. On the other hand, the wrought iron and steel of that day did possess, in their different characteristics, the qualities cast iron lacked. Yet high cost of production prohibited their use in great quantity. Crucible steel, made in crucibles containing only about 80 pounds, was expensive and took many days to refine. This was not unduly restrictive for our needs in producing hand tools, cutlery, needles, and watch springs. However something quite different was required if the march of modern industry was to get under way.

New needs—particularly for the railroads—were beginning to be felt. Most ironmakers of that period came up against the same problem in their day-to-day work. As currently stated, they required an “improved cast iron,” one in which brittleness gave place to toughness and malleability. This involved the elimination or control of most of the so-called impurities, such as carbon, silicon, manganese, sulphur, and phosphorus. The nub of the problem was to discover a means by which the temperature of molten iron could be raised quickly and cheaply so as to oxidize or drive off the troublesome elements.

In retrospect we can see that the surging flood of industrialization was waiting upon the discovery of a new structural material. The product must be such that qualities of hardness, toughness, and malleability might be varied according to particular needs. It must be cheap and above all

abundant. In a word, we needed steel. Steel in the twentieth-century sense, or as a leader in the industry has recently expressed it, "that greatest of modern plastics."

While the general nature of this objective was recognized, ironmakers and scientists proceeded gropingly toward its realization. Among them were two individuals who, acting separately, chanced upon the solution to the problem—William Kelly, practical ironmaker of Eddyville, Kentucky, and the English scientist, Henry Bessemer.



The converter invented by the American, William Kelly, which preceded Bessemer's converter

Courtesy of American Iron and Steel Institute

Kelly was the first to make discovery of the new process but was unsuccessful in promoting its adoption. Bessemer came upon the same idea some years later and after incorporating certain improvements by Mushet gave the world a process for making cheap steel. In securing wide application of this method he succeeded where Kelly had failed.

Kelly's story begins shortly after he acquired the Suwanee Iron Works at Eddyville in 1846. The principal uses for the iron produced in that area were boilers and engines for river steamboats and equipment for Louisiana sugar factories. Kelly made boilers and sugar kettles. Like so

many others of these early ironmakers Kelly found it difficult to secure enough charcoal for refining pig iron to sufficient malleability for his purposes.

One day as he watched his "finery fire" his eye was caught by a small spot in the molten mass which glowed at a white heat, although bare of charcoal and subject to a draught of cold air. Like a flash the great conception came to him. The draught of cold air *raised* the temperature instead of lowering it. Air blown into a molten mass of iron would therefore help burn out the impurities. Air itself was fuel!

Kelly then proceeded to stage a demonstration of this remarkable phenomenon. When the sample product was finished, he had a blacksmith forge it into a horseshoe and nails to prove its malleability. The utter simplicity and common sense of Kelly's idea was too much for practical hardheaded ironmakers. The use of cold air to make iron hotter was absurd. "Some crank'll be burnin' ice next," said one onlooker."¹ This procedure came to be known as "Kelly's air-boiling process." He was, however, unable to convince others in the industry that he had chanced upon a great discovery.

In the meantime the inventor, Henry Bessemer, at his experimental shop in London, was independently pursuing the same objective—a cheap method for producing an "improved cast iron." His approach was that of a scientist. He defined his objective and then searched with innumerable experiments toward that end. Bessemer's interest in this problem had originally been aroused through his unsuccessful attempt during the Crimean War to adapt cast-iron cannon to the use of rifled projectiles. The idea failed because cast iron was not tough enough for the stresses involved. He set out to produce a stronger material.

Through two years of alternate hope and discouragement Bessemer carried on his experiments in a little out-of-the-way forge in London. Finally he chanced to observe the same phenomenon that Kelly had seen. A draught of cold air impinging upon a small area of molten pig iron apparently caused a rise in temperature at that particular spot. Bessemer's trained mind saw at once that if this principle could be applied as a process, he had found a way to oxidize the impurities of cast iron and thus produce the improved material he was seeking.

Accordingly he proceeded to force air in fine streams through the molten mass. Success exceeded his expectations. Rapid, violent oxidation of carbon, silicon, and manganese took place. The product lost the brittleness of cast iron. It was strong, tough, and malleable. For this final step, air itself was the only fuel needed. Later in a paper read before the British Association for the Advancement of Science, Bessemer referred

to the process as "The Manufacture of Malleable Iron and Steel without Fuel."

All problems, however, were not yet solved. This new material must be produced at low cost and made available in abundant quantities. To do this it was necessary to design equipment on what seemed a gargantuan scale—something which would dwarf the attendant workmen into pygmy size. Hand operation must give way to steam power. In this matter of visioning and perfecting new equipment Bessemer showed himself a master. The Bessemer converter became one of the most important of our industrial tools. Through its use tons of steel were made in a few minutes of "blow" where formerly weeks were consumed to produce only pounds.

Great as these discoveries were, Bessemer's "pneumatic process" hung between success and failure. Fate had decreed a period of suspense before the climax. The weakness of the process was that it was too effective. The rise in temperature occurred so suddenly that it was difficult to control the extent of oxidation. Fortunately within a short time remedies were found to cure this defect. Another Englishman, Robert F. Mushet, and a Swede, Frederick Göransson, came forward with improvements in method by which the composition of the product was effectively brought under control by the addition of manganese. The Bessemer process was now ready for broad application. Old ironmakers saw in the product only an "improved cast iron." To the world, however, it soon became known as Bessemer steel, the much needed, all-purpose, cheap structural material.

In 1856 Bessemer applied for a patent in the United States. Immediately upon hearing of this William Kelly filed his claims and the Patent Office recognized the priority of Kelly's discovery. Bessemer's application was denied and Kelly was granted the much-desired patent on the new process.

Shortly, under the pressure of war needs here and in the light of the success of the Bessemer process in England, our ironmakers began to sense that great events were in the making. The Kelly Process Company was formed to take over the Kelly patent. The principals in this enterprise were Captain E. B. Ward of Detroit, Z. S. Durfee of New Bedford, Daniel J. Morell of Johnstown, William M. Lyon and James Park Jr., of Pittsburgh.³ In 1864 this group also acquired the American rights to the Mushet patents.

But in this same year, John F. Winslow, John A. Griswold, and Alexander Holley of Troy, N. Y., obtained United States rights for the use of Bessemer equipment. It looked for awhile as though the adoption of the Bessemer or Kelly process in the United States might be seriously delayed. The Kelly group found it difficult to proceed without Bessemer's equipment. The Troy group could not operate without infringing Kelly

and Mushet patents. To the businessmen involved in this situation the obvious solution was a merger of interests. Accordingly in 1866 all American patents of the two groups were consolidated in the hands of trustees, finally to rest in the Bessemer Steel Company, Ltd. (Pa.). Licenses were granted to American ironmakers for using the pneumatic process and the Bessemer equipment. The Age of Steel had finally opened in the United States.

This event, following within one generation the practical application of steam power to manufacturing and transportation, was the final signal for the coming in of the great era of modern industry. The qualities of this new material opened undreamed-of horizons in the quantity production and distribution of goods. Its application would advance the efficiency of practically every manufacturing industry and all systems of transportation. It would bring benefits to all our people. It would assist greatly in raising our standards of living.

Nor were our people slow to realize the potentialities of this discovery. Americans took to steelmaking and steel usage as though born to the inheritance. Within the same thirty years that saw the building of Rockefeller's powerful Standard Oil Trust, steel production became a great industry in the United States. From an almost negligible output we forged ahead to wrest the crown of world leadership from Great Britain. This was an area of John Bull's industrial empire closer to his heart than any other. Even for some years after the Civil War our railroads were being laid with English rails.

That we should encroach upon this domain was unthinkable to English iron masters. In the year 1870 we made in the United States only 77,000 tons of steel compared to Great Britain's 292,000 tons. Within one generation, that is by the year 1900, we were making 10,000,000 tons per annum as compared to 5,000,000 for Great Britain. Several years later we were producing four times as much as Britain and were accounting for almost one-half of the total world production.

Our industrial triumph was due to various things. Geologic travail on the North American continent had brought to the earth's surface in Michigan and Minnesota the world's greatest known deposits of iron ore. Similarly in Pennsylvania, Illinois, and Ohio abundant coal for coking was available. With our extensive open spaces to conquer we had the largest market in the world for steel rails. Finally the Republican party in control of Congress set up an almost impenetrable tariff wall.

Taken along with the development of the Bessemer process, the ingredients for progress were all present. That they were exploited so effectively was due to the imagination, ingenuity, and aggressiveness of our

new steelmakers. Least impressive in physical stature among them was one who rose to dominate the industry—Andrew Carnegie.

The story of Carnegie is in large measure the story of our rise to power in steel. Fate's idiosyncrasies are proverbial. Here was a Scot taking the methods of an Englishman, Henry Bessemer, to wrest from Great Britain world leadership in steelmaking.

The career of Andrew Carnegie is typical of the success stories of many of our leading industrialists under the American system of wide-open opportunity. At the age of twelve, in 1848, he was brought from Dunfermline, Scotland, to Allegheny City, Pennsylvania, and shortly thereafter went to work in Pittsburgh. There could hardly have been a more humble beginning. The family was poor. Andrew Carnegie had neither influential friends nor training. His start was truly from scratch.

From a job as messenger boy he soon mastered the new technique of operating a telegraph key. Then the Carnegie luck began to run. His work came to the attention of an older man whose affairs had already begun to prosper—Thomas A. Scott of the Pennsylvania Railroad. In 1859 when Scott was promoted Carnegie succeeded him as Superintendent of the Western Division.

By this time it had become apparent that this little Scot was no mill-end product. He had begun to show his qualities. He possessed a self-confidence that was appalling. He sought responsibilities with the same ardor that most persons use in avoiding them. He could make clear-cut decisions in a forthright manner and, what was more, make them right.

In our expanding economy Carnegie saw the power of investment capital. He set about getting some. Like many other successful men he started in business as a chance taker. His first venture was at the instance of Scott. Carnegie purchased ten shares of stock in the Adams Express Company, having borrowed the necessary funds upon the security of his little family home.

Shortly thereafter the vagaries of luck put him on the same train as Theodore T. Woodruff. The latter showed Carnegie a model of his new invention—a sleeping car. Again the would-be capitalist borrowed a few hundred dollars and took a one-eighth interest in the venture. The project bloomed to success and its profits gave him a start with a small pool of capital.

About this time Drake had just brought in his first oil well and we find Carnegie with some associates buying the Storey farm in the Oil Regions. Luck was running stronger now. These venture capitalists struck oil. Profits began to roll in. Accordingly in 1865 Carnegie resigned from the Pennsylvania Railroad to retire and take it easy at the ripe old age

of twenty-nine. His annual income from his investments was already around \$50,000. Instead of an easy life, however, the next thirty-five years were to be crammed with responsibilities and accomplishments.

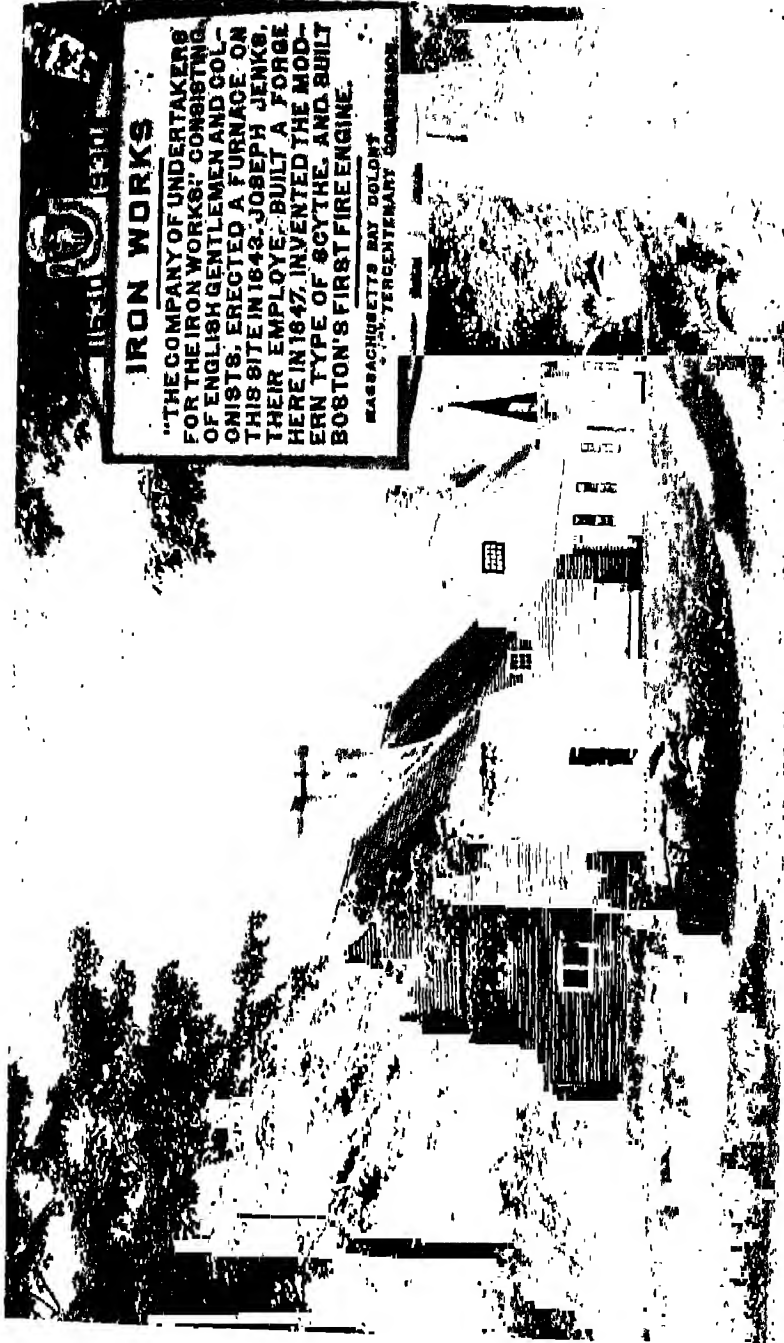
As in the case of Rockefeller, but in a different way, the railroads unlocked the doors of opportunity to Carnegie. We have noted Carnegie's interest in the Woodruff sleeping car. He also foresaw that railroad bridges of wood must be supplanted by those of iron. He noted the rapidly growing demand for rails. His alert imagination discerned a future of unlimited possibilities for railroad transportation in this country of vast distances. He plumped body and soul into the field of selling to the railroads the things they needed. By 1865 Carnegie held a stock interest in the Central Transportation Company (sleeping car), Keystone Bridge Company, Union Iron Mills (bridge beams), Superior Rail Mill, and the Pittsburgh Locomotive Works.

But these varied interests were not enough for this self-styled "retired" capitalist. In his odd moments he became a salesman of railroad bonds. On his frequent trips to Europe this irrepressible little Scot would burst into the cloistered quarters of staid English merchant-bankers selling bonds of the Pennsylvania Railroad and the glowing future of everything American. At this stage he was not fulfilling his advice of later years—"Put all your eggs in one basket and then watch the basket." In fact he had spread himself pretty thin.

On one of these "vacations" in London he had the good fortune to meet the man whose inventions were about to revolutionize the world of industry—Henry Bessemer. Carnegie was shown a Bessemer converter in operation with its volcanic display of flame, sparks, and incandescent gases. This focused his attention on the possibilities of cheap steel.

Shortly thereafter we find him promoting and organizing the Edgar Thompson Steel Works, Ltd., just as the panic of 1873 struck the country. This did not stop him any more than it did James J. Hill or Rockefeller. He pushed vigorously forward to secure the best in men and equipment for the business of making Bessemer steel rails. The entrenched interests in the iron and steel industry shook their heads prophetically at the brashness and temerity of this upstart who knew nothing of steelmaking and who was crazy enough to put up a new mill when the old ones were starving from lack of business.

Yet there was not only method but a touch of genius in his madness. This thing called steel was but in its infancy. Its growing application in the industrial world would challenge the imagination. Thus he was undisturbed at starting his business in a depression. The new plant had the latest and most efficient equipment. Carnegie made a fetish of low



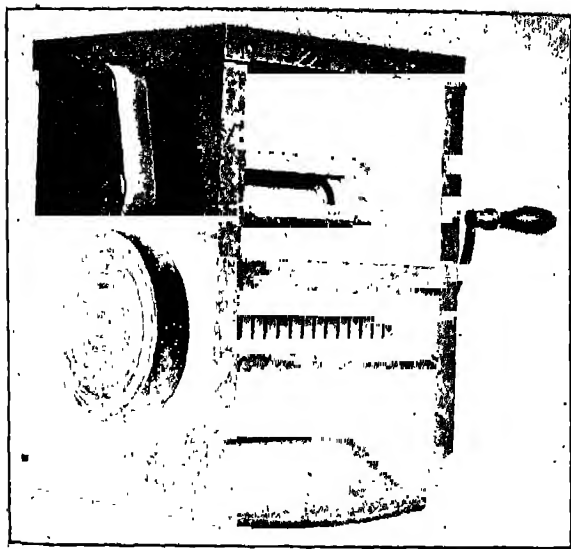
1830 1840

IRON WORKS

"THE COMPANY OF UNDERTAKERS
FOR THE IRON WORKS," CONSISTING
OF ENGLISH GENTLEMEN AND COL-
ONISTS, ERECTED A FURNACE ON
THIS SITE IN 1643. JOSEPH JENKS,
THEIR EMPLOYEE, BUILT A FORGE
HERE IN 1647, INVENTED THE MOD-
ERN TYPE OF SCYTHE, AND BUILT
BOSTON'S FIRST FIRE ENGINE.

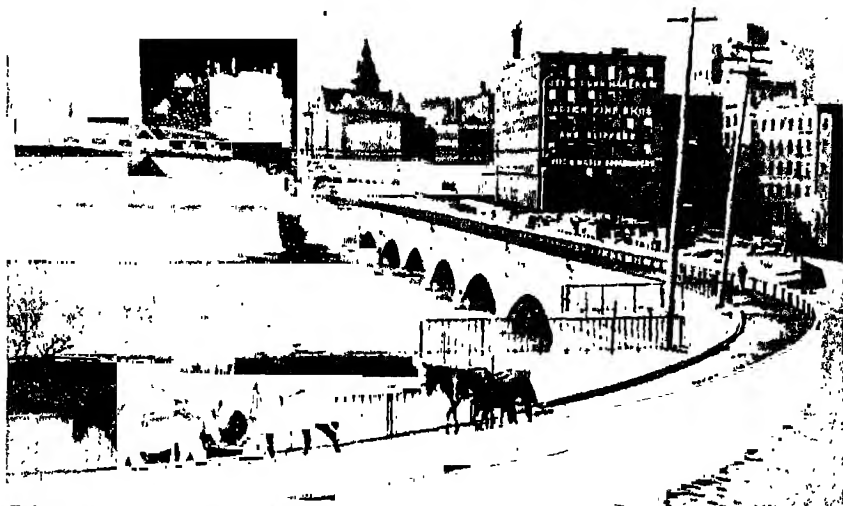
MASSACHUSETTS BAY COLONY
1630-1780
TERCENTENARY COMMISSION

Historic landmark of American industry
Courtesy of *Steelways*, American Iron and Steel Institute



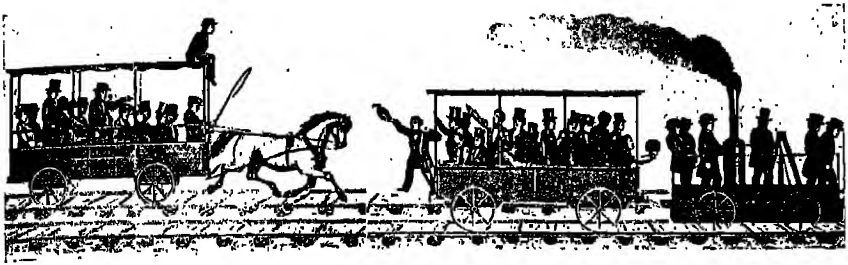
Model of Whitney's cotton gin in the United States National Museum. This labor-saving device opened the long reign of King Cotton; established the slave-plantation economy of the South; made possible the textile industry of New England; and indirectly contributed to the sectional conflict of interest which ended in the Civil War.

From *The Pageant of America*. Copyright Yale University Press



Erie Canal in its crossing of the Genesee River at Rochester. When first accomplished in the 1820's this was considered one of the great engineering achievements of the day.

From *The Towpath*, by Arch Merrill



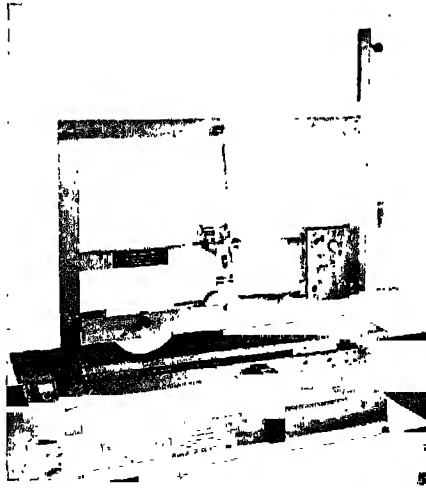
Trial of speed between Peter Cooper's Tom Thumb locomotive and a horse car,
from William H. Brown, *The History of the First Locomotives in America*

From *The Pageant of America*, Copyright Yale University Press



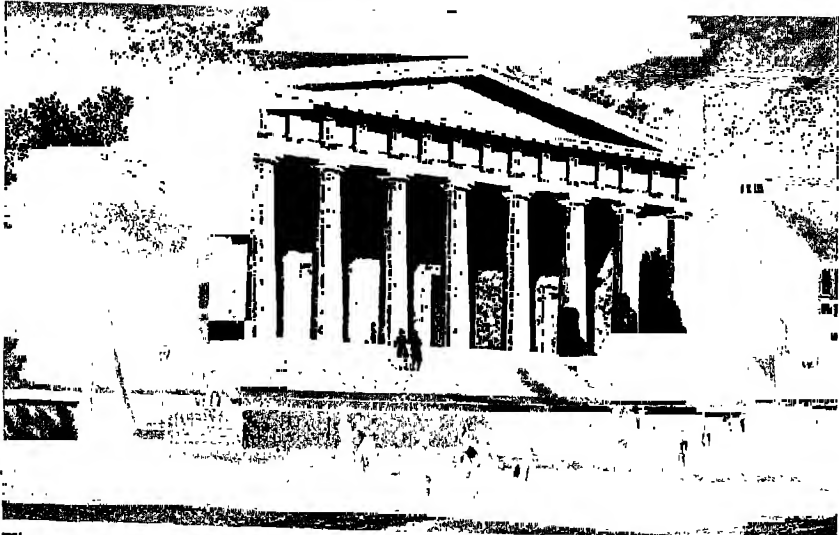
Samuel F. B. Morse in his workshop

Courtesy of the Western Union Telegraph Company



Original telegraph apparatus built by Morse in the winter of 1835-6 at New York University where he was professor of the Arts of Design. The receiving instrument at the top was built on an old picture frame. In the portable transmitter at the bottom, messages were recorded by means of movable metal type which reacted with the making and breaking of the electric current.

Courtesy of the Western Union Telegraph Company



The second United States Bank, Philadelphia. This was the main office of the institution presided over by Nicholas Biddle, arch enemy of the fiery Andrew Jackson.

Culver Service



Old-time wagon peddler. These itinerant salesmen canvassed rural communities from Maine to the Mississippi. It was by such means that Eastern manufacturers were first enabled to achieve a national distribution of goods.

From John A. Kouwenhoven's *Adventures of America*, a Pictorial Record from *Harper's Weekly*



Landing of the first permanently successful Atlantic cable in 1866 at Hearts Content, Newfoundland

Courtesy of the Western Union Telegraph Company



Scene in building Pacific Railroad

From John A. Kouwenhoven's *Adventures of America*, a Pictorial Record from *Harper's Weekly*



Actual view of the joining of the tracks of the Union Pacific with those of the Central Pacific, to accomplish the dream of a nation's people—a Pacific Railroad. This driving of the golden spike took place on May 10, 1869 at Promontory, Utah.

Courtesy of the Union Pacific Railroad



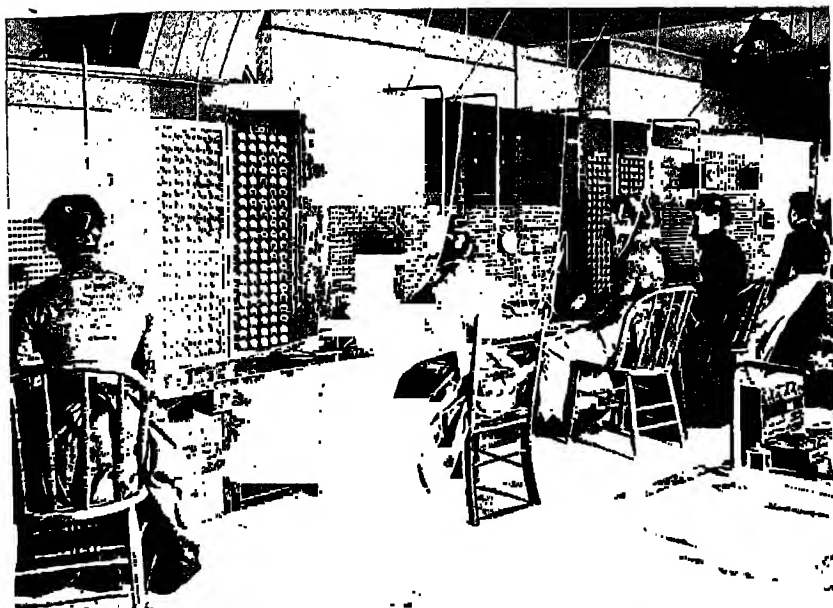
An early oil refinery

Photo by Mather. Courtesy of the Standard Oil Company (N. J.)



View of modern oil refinery—fractionating unit and storage tank

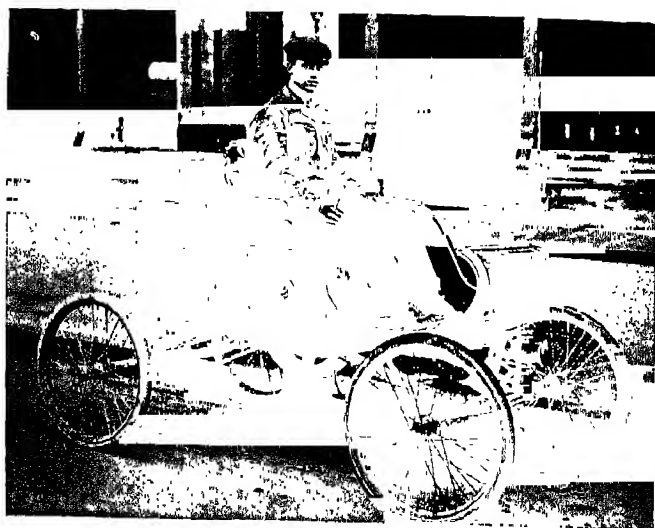
Photo by Corsini. Courtesy of the Standard Oil Company (N. J.)



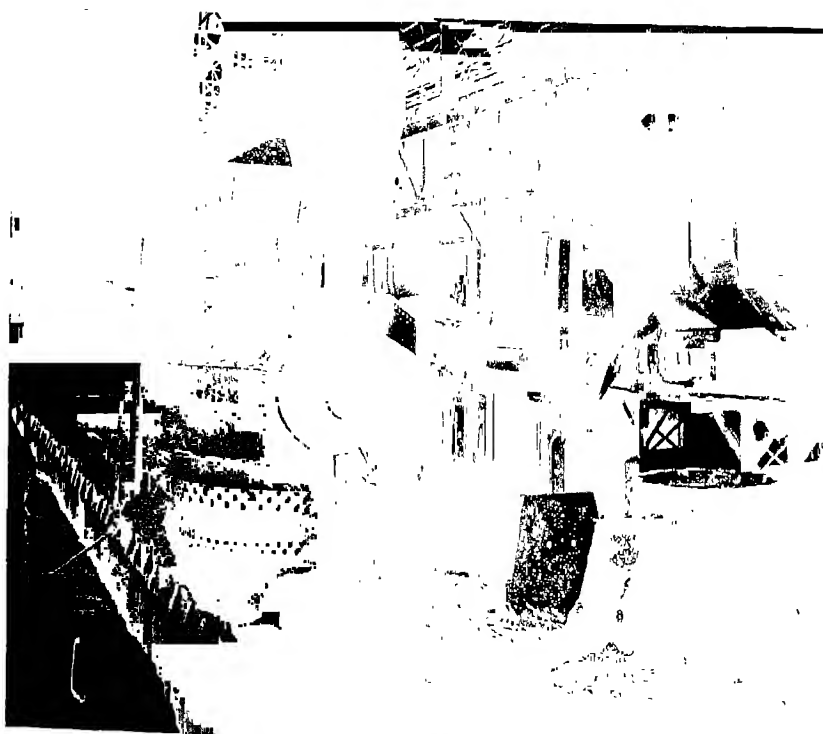
Telephone switchboard in Milwaukee in 1883
Courtesy of the American Telephone and Telegraph Company



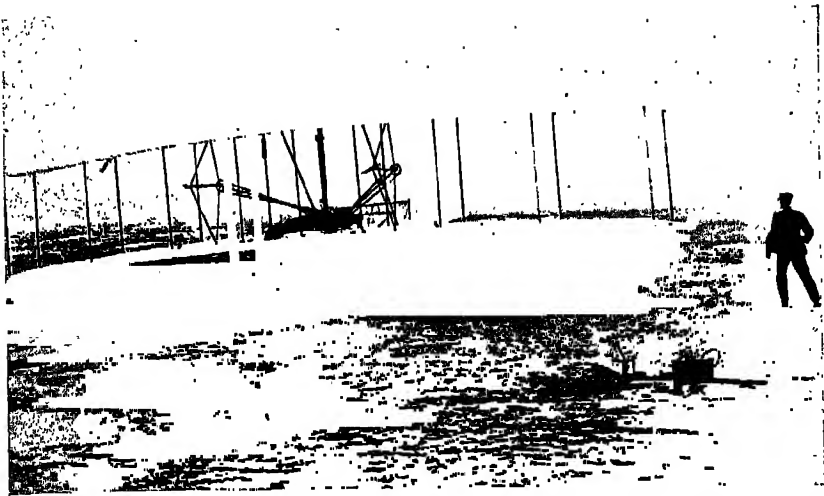
The daughter of Christopher Sholes, inventor of typewriter, using an early machine in 1872.
Herkimer County Historical Society



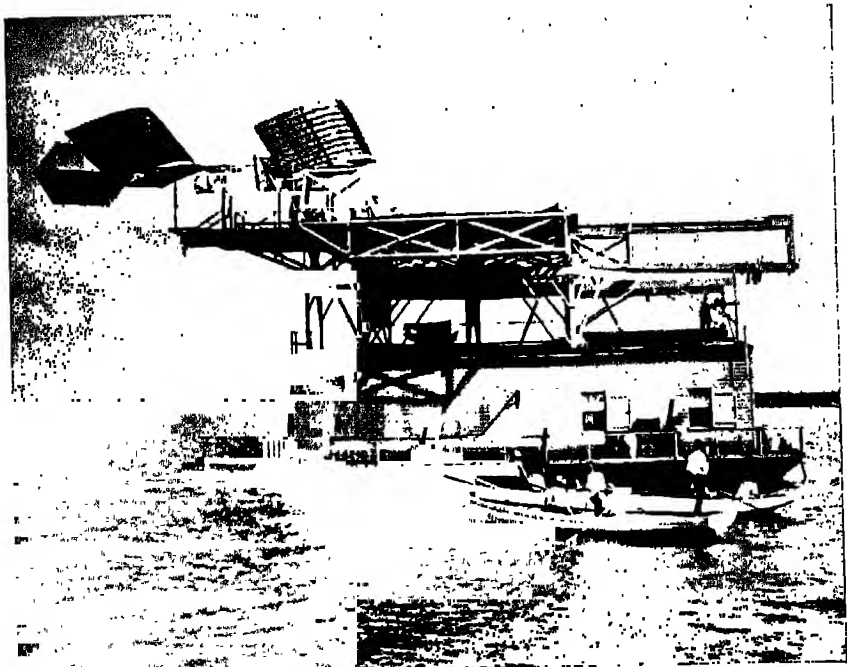
Roy Chapin in one of the famous curved-dash Oldsmobiles
Courtesy of General Motors Corporation



View in modern steel plant of the pouring of steel into ingot molds
Courtesy of the United States Steel Corporation

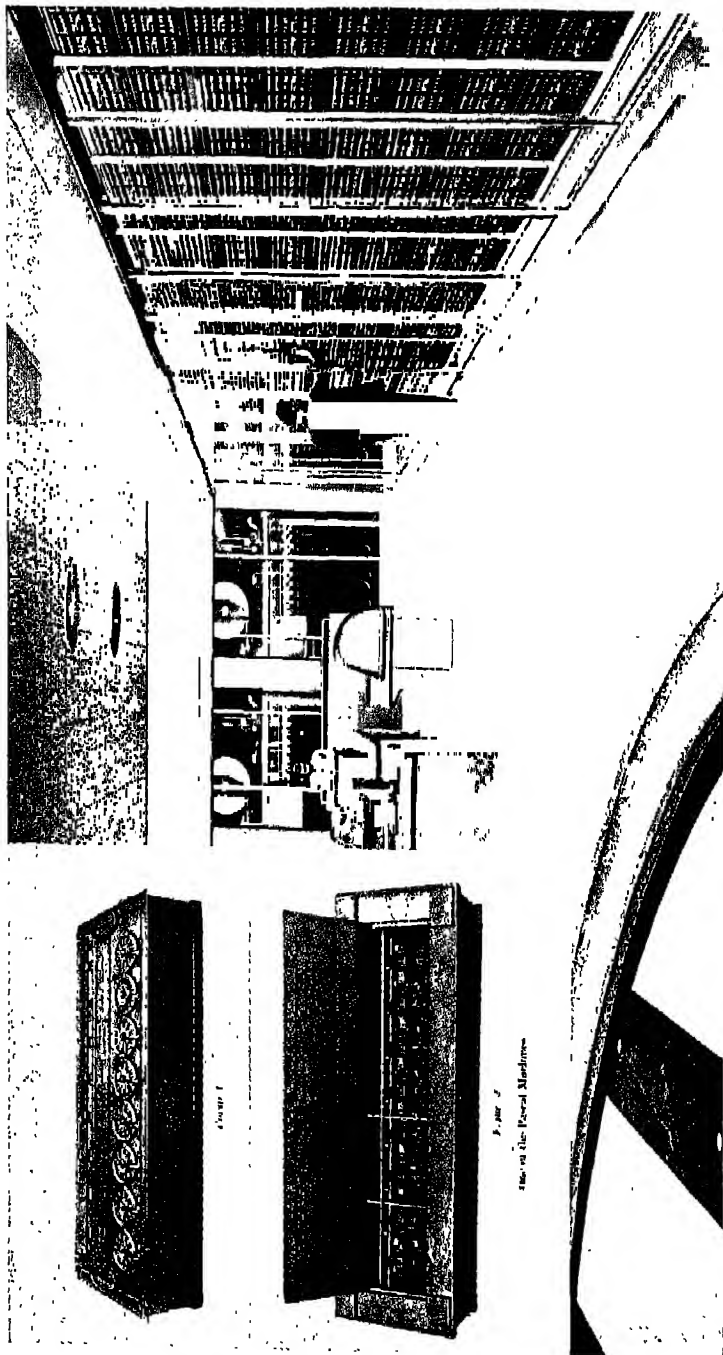


One of the Wright brother's epoch making flights at Kittyhawk in December, 1903
 Courtesy of the Institute of the Aeronautical Sciences



The Langley "Aerodrome" before launching from houseboat on the Potomac River. It met disaster in final attempt at power sustained flight just a few weeks before the triumph of the Wrights.

Courtesy of the Smithsonian Institution



One of the first calculating machines (insert) invented by Pascal (1623-1662), and view of the latest electronic calculator which occupies the space of a large room. This latter device makes use of over 12,000 electronic tubes. In such fields as advanced physics, astronomy and industrial research it will perform, within the space of a few hours, work which formerly required long months of calculating.

Courtesy of International Business Machines Corporation



Morgan Library in which J. Pierpont Morgan assembled leaders of banking and business to combat panic of 1907

Courtesy of The Pierpont Morgan Library

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LESLIE'S WEEKLY

November 7, 1907

How the Money Panic in Wall Street Was Stopped

By Albert C. Stearns, formerly Editor of "Herald's"



HENRY OSBORNE T. DREXLER.
Copyright, 1907, by Henry O. Drexler.

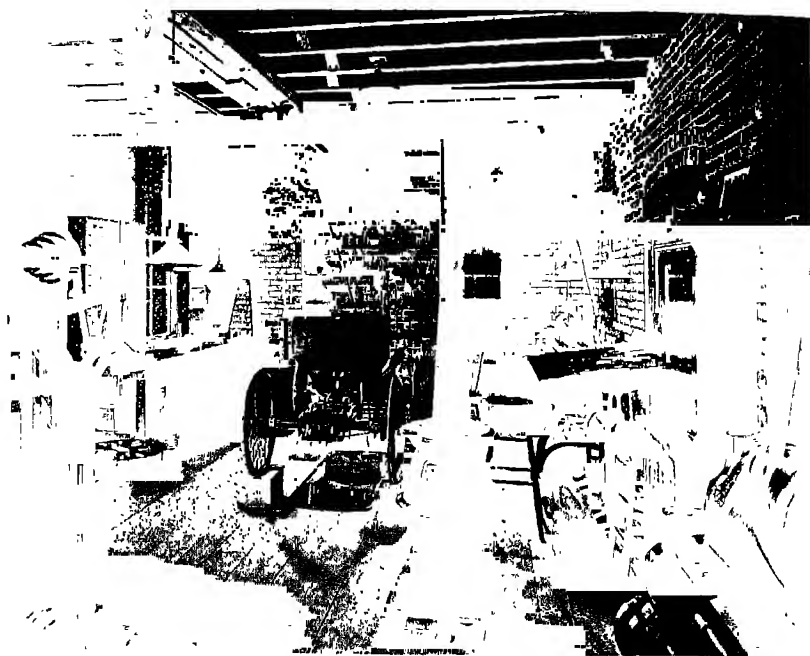


J. PIERPONT MORGAN.
Copyright, 1907, by J. P. Morgan.

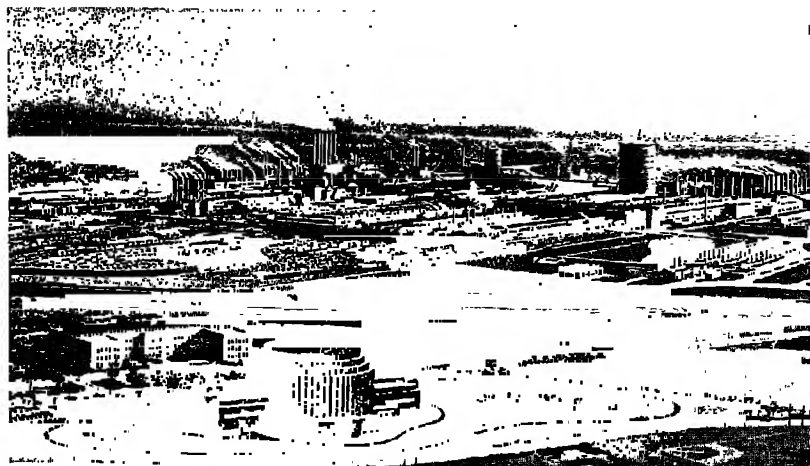


JOHN D. ROCKEFELLER.
Illustration by R. A. Ford

MEN WHO CAME TO THE RESCUE WHEN THE PANIC WAS AT ITS WORST.

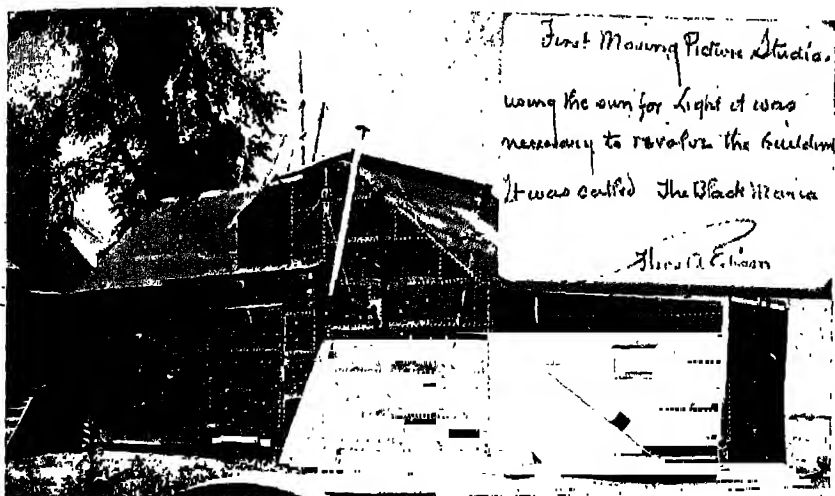


Birthplace of the Ford motor car
Courtesy of the Ford Motor Company



From the little one room shop (above) there has grown the world's largest integrated company-plant "city"—the River Rouge plant of the Ford Motor Company.

Courtesy of the Ford Motor Company



The first movie studio, Edison's "Black Maria"—where it all started!
 Courtesy of The Museum of Modern Art Film Library, New York City



The diminutive pantomimist whose earnings within a decade jumped from a few hundred a month to over a million dollars per year—Charlie Chaplin in "The Tramp."

Courtesy of The Museum of Modern Art Film Library, New York City



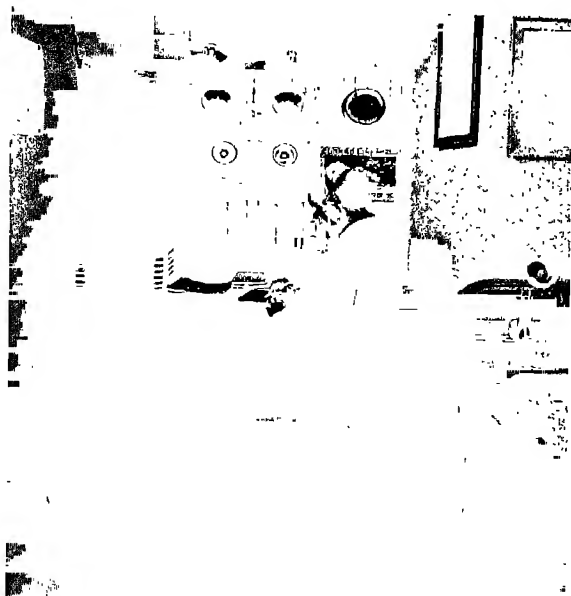
Mary Pickford, second to none in bringing paying customers to the box office.

Courtesy of The Museum of Modern Art Film Library, New York City



Guglielmo Marconi at the receiving set at St. Jolus, Newfoundland, December, 1901, on the occasion of the first transatlantic transmission of wireless messages

Courtesy of The Radio Corporation of America



David Sarnoff at the start of his career, in 1912, working as a wireless operator at Wanamaker's Radio Station. Eighteen years later he became president of the Radio Corporation of America.

Courtesy of The Radio Corporation of America

operating costs. Finally, and perhaps most important of all, he had Captain Bill Jones.

As a head production man at the Edgar Thompson Works, Jones was one of the most colorful figures in this spectacular industry. He was a two-listed, hard-hitting, practical steelmaker who possessed qualities of leadership that caused men under him to perform almost beyond the limits of human capacity. Jones improved the Bessemer converter and developed the Jones mixer. He trained and taught men who would later lead the industry, among them a likable go-getter named Charles M. Schwab. In subsequent years the proudest boast of a steel executive was that he had been trained by Bill Jones. When offered a partnership interest by Carnegie, Jones refused it but asked for a "Hell of a big salary."³ Carnegie gave him the same as that of the President of the United States. This points to another one of Carnegie's basic policies. When asked by a parsimonious banker how he could afford to pay his men so well, he replied, "I can't afford to pay them any other way."⁴

When Carnegie and Jones really got started, the steel industry sat up and took notice. At production Bill Jones was a miracle man. As a salesman Carnegie had no equal. Besides an armor-plated self-confidence he possessed a flair for dealing with big men. He called on Vanderbilt, Gould, Huntington, and other railroad leaders, usually coming away with huge orders for rails. These accomplishments by a newcomer in the industry did not endear him to his competitors. Neither did the fact that he disliked the pools which the industry arranged for dividing up the rail business. Carnegie believed that Bill Jones could make steel cheaper and that he, Carnegie, could sell more of it than any of his competitors. Why then should they tie themselves to less capable operators?

From this time on it was a constant progression of building with men and equipment. Andy's passion for the most up-to-date plant and machinery is said to have prompted him repeatedly to remark at annual meetings, "Well, what shall we throw away this year?"⁵ Frequently new and costly equipment would be scrapped if something better were suddenly discovered. At all costs they must make steel cheaper. The development of the steel business after 1870 was in effect more the coming in of a new industry than the expansion of an old one. The process of manufacture was new and the principal uses of the product were new. Perhaps this is one of the reasons why Carnegie so outdistanced his more seasoned competitors.

While Andy was peddling rails from one office to another, his future partner, Henry Clay Frick, was buying up coal lands around Connellsville, Pennsylvania, and building little coke ovens. He also found the

depressed years following 1873 advantageous to his plans of acquisition. By 1881 Frick controlled nearly 80 per cent of the Connellsville coke but was heavily in debt. Carnegie sensed the great value of this supply of raw material. Accordingly he purchased from Frick a control of the ex-



Early Bessemer converter in action

Scientific American, August 30, 1879

tensive coal deposits and induced Frick to join the Carnegie team. This put Carnegie one large jump ahead of his competitors.

The next jump of major proportions did not occur until the panic of 1893. In the meantime, the Merritt brothers of Duluth had discovered the great Mesabi iron ore deposits lying to the northwest and north of Lake Superior. This was one of the world's greatest mineral treasures. The ore was rich, comparatively soft in quality, and lay in large exposed

bodies. It was the answer to the iron miner's dreams. No more hard, dangerous underground work. This Mesabi ore could be mined on the surface simply with huge steam shovels dumping ore directly into railroad cars.

The importance of the discovery was not at once apparent. While Carnegie and Frick bought some leases they were not overly enthusiastic about the area until a gentleman who could see beyond the horizon and around the corner took an interest. Following the crash of 1893 John D. Rockefeller moved into the Mesabi. At depressed prices he bought up a vast treasure of iron ore, remarking casually, "I was astonished that the steelmakers had not seen the necessity of controlling their ore supply."⁶

This act brought two of the great industrial giants of the day into what promised to be warfare without quarter. Carnegie as the leader in steel production could ill afford to have an outsider control his raw material. An even greater threat was the thought that Rockefeller with his enormous wealth and outstanding abilities might break into the steel business.

One of Carnegie's greatest qualities, however, was his capacity to adjust quickly to changed conditions. Instead of fighting, he made an ally of the invader. Rockefeller-Carnegie leases were negotiated under which the Carnegie Steel Company had the right to mine ore on the Rockefeller properties; as partial consideration, Carnegie agreed not to seek other Mesabi sources of supply. Now through the Frick acquisition he controlled the largest and best supply of coking coal and through the Rockefeller leases the greatest reserves in the world of high-grade, low-cost iron ore. There was no longer any question who was the czar of the steel industry.

Meanwhile Carnegie participated in another technological revolution in the science of making steel. During the eighties and nineties our steelmakers had begun to employ the open-hearth process which within a generation was to lead all other methods. This name is something of a misnomer in that the device is not really open but consists of a shallow hearth closed on the sides and covered on the top by a low reverberatory roof. The discovery of this method of producing steel was not as sudden or sensational as in the case of the Bessemer process. But it was a great achievement in a development which was coming increasingly to the fore—the alliance between pure science and industrial production.

Here once more the modern world is under heavy debt to an English scientist born and educated in Germany, Sir William Siemens, who had devoted himself to the study of principles of heat conservation and heat exchange. In the 1860's he attempted to apply his conclusions to the practical matter of making steel. His problem, like Bessemer's, was one of

securing higher temperatures in molten pig iron for oxidizing the foreign elements, carbon, silicon, phosphorus, and so forth. Siemens, however, adhered to the traditional methods of applying heat externally to the iron mass rather than Bessemer's revolutionary idea of generating heat internally within the melted iron.

Siemens realized that under former practice waste gases were carrying away a precious supply of heat units. His studies had convinced him that if in some way this waste heat could be utilized he could obtain higher temperatures in the molten metal. To accomplish this he evolved a system using a gaseous fuel and regenerative chambers for recapturing the heat of the waste gases.

Under the Siemens' open-hearth process waste gases pass from the combustion hearth into large chambers containing latticed stacks of fire brick. Heat passes from the gases into the brick. Then, having diverted from such chambers the flow of waste gas, new fuel gas and air are driven through, absorbing heat from the fire brick. In this pre-heated state the gas and air pass into the hearth and are ignited in a flame which fans out over the melted mass of iron and scrap to be treated. A higher temperature is thus secured than when using cold gas and cold air. Heat units have been transferred successively from waste gases to fire brick, to the new fuel supply, and then to the molten iron. By employing two chambers alternately, first for absorbing heat from the waste gases and then for transferring it to the fuel gas and air, Siemens obtained a continuous process. It was also found that the addition of small charges of iron ore to the molten pig iron and scrap increased oxidation.

The process is much slower than the Bessemer, taking hours as compared to minutes. Its advantages lie in a higher degree of flexibility and a more effective control of metallurgical reactions. The "basic" open-hearth method, using limestone in the mixture and a basic or alkaline hearth, was particularly effective in refining certain phosphoric iron ores available in great quantities in America. Consequently the adoption of the open-hearth process in this country proceeded rapidly. By 1908 open-hearth steel led Bessemer and in 1910 some sixteen million tons of the former were produced as compared to a little more than nine million tons of Bessemer. With these two processes in use our steelmakers were prepared to meet almost any requirement in quality of steel as well as the quantities needed by our growing industries.

As the turn of the century was reached Carnegie could look back with a sense of accomplishment on his twenty-seven years in the steel business. His company alone was making four million tons of steel per year compared with the total for Great Britain of five million. It had assisted in the

improvement of production methods whereby the price of steel rails was reduced from \$166 to \$18 per ton. He had started from scratch and seen the profits of his enterprise grow to \$40 million per year.

At this point Carnegie made an important decision. He would sell the Carnegie Steel Company. He would retire, travel, and amuse himself, leaving to others the battlefield which he, as the Little Corporal, had so long dominated. To dispose of the great property worth upwards of \$300 million was, however, no simple task. The solution was worked out when J. Pierpont Morgan became the purchaser of the Carnegie Empire. The means used was the creation of a huge consolidation—the United States Steel Corporation.

Up to just what point and to what degree Carnegie directed the events that led to Morgan's purchase it is difficult to say. It is easy and dramatic to see in them the cleverest kind of salesmanship by one who had shown himself a past-master in the art. On the other hand Morgan, who needed no guardian, was striving toward certain goals which he believed would be constructive for the steel industry. It was not only a successful sale on Carnegie's part but as time was to prove, a profitable purchase on Morgan's.

Some years previously J. P. Morgan & Co. had financed a consolidation of companies in the steel tube business. This National Tube Company, with some nineteen plants capitalized at \$80 million, dominated the market in its field. As the year 1900 approached the steel industry became agog with rumors that converting companies such as the National Tube were going to start making their own steel. Up to that time the basic steel had been purchased from the Carnegie and other producing companies. Whether there was any real basis for suspecting that National Tube was contemplating such a move, it is difficult to say. Therefore Carnegie's next move is susceptible of different interpretations. He may have been simply acting defensively in a field of competitive warfare. On the other hand it is possible that he himself was taking the offensive.

In any case Carnegie and Charles M. Schwab, President of the Carnegie Company, let it be known that the Carnegie Company would soon depart from established policy and go into the tube business. They proposed to erect the largest and most modern of tube mills at Conneaut on Lake Erie. This was bad news to Morgan and the National Tube people. They knew Carnegie to be a ruthless and unpredictable competitor. It was a threat of war.

Subsequently, in an investigation, both Carnegie and Schwab protested naively that they had never heard of any threat to the National Tube. Said Carnegie, "All of this is new to me. I never heard of it before. . . . Of course,

you must remember that the tube works (National) were very old, and had been running for a long while, and this project of ours was a total departure."⁷

Next the curtain goes up on a select dinner party of leading businessmen given by J. Edward Simmons at an exclusive uptown New York club. Care had been taken to see that Morgan and some of his associates would attend. The principal speaker was Charles M. Schwab who with the spoken word was to the business world what Bryan was to the political. Schwab, as Carnegie's Chief of Staff, obviously addressing himself to Morgan, described in glowing terms the great strength of the Carnegie Company. He then went on to paint in vivid colors what a wonderful future there would be in further integration and organization of the steel industry. The seed fell upon good ground. Shortly thereafter Morgan sent word to Schwab that he would like to talk things over.

It was Morgan's custom to hold important conferences in his library. There, surrounded by priceless works of art, this forceful leader of banking and industry would tackle his problems. In this sanctum combinations were decided upon, tottering banks were saved, and constructive forces mobilized against panics. Banking and business in this country had a leader of outstanding and forceful capacity. This leadership was widely recognized. Morgan's judgment was far-sighted. His integrity was unquestioned. He had a capacity to make prompt, clear-cut, and courageous decisions. The priceless ingredient, however, was his sense of responsibility. In time of trouble he was willing to give unstintedly of himself and his resources in the common cause.

This particular meeting lasted from late in the evening until dawn. Schwab again pictured the advantages and profits which would come from a comprehensive integration of the steel industry, by bringing the converting companies into the same control as the Carnegie Company with its reserves of coal, iron ore, shipping, and steel producing capacity. These converting companies made end products such as pipe, shapes, plates, etc., buying their raw material, steel, from large producers. Morgan listened and questioned and then listened some more. Finally he said tersely, "Well, if Andy wants to sell, I'll buy. Go and find his price."⁸

Schwab went to Carnegie and the two conferred. In negotiations of this kind Carnegie could take care of himself. He proceeded to. Previously he had indicated a willingness to sell the whole Carnegie Company for \$320 million. During the intervening time, however, its profits had gone up almost 25 per cent. Carnegie increased his price by that amount. He scribbled down on a piece of paper \$400 million. Schwab hurried with this

to Morgan who was never given to horsetrading and beating around the bush. His answer was characteristic. Without qualifying adjectives, or hedging phrases, it was simply a gruff, unequivocal, "I accept."

In the meantime the Morgan office, "The Corner," was a hive of activity. It was necessary to make a deal with each of the other companies involved in the grandiose plan. Elbert H. Gary of Federal Steel was called in as were the best legal brains of New York. Gary later testified, "The first proposition was as to whether or not we would organize a complete corporation which should be self-contained, which should be in a position to operate at the lowest cost of production and which would have sufficient finishing mills and sufficient capital to be able to compete with other manufacturers throughout the world. . . . It was on that basis we started this organization; it was on that basis we finished it." °

The resulting combination, the United States Steel Corporation, was the climax to a period of corporate consolidations. It was a consolidation of consolidations. Its great size and concentration of power at once flattered the vanity and shocked the conscience of the American people. There were put together under one operating control the following companies: Carnegie Steel, Federal Steel, National Steel, American Bridge, American Tin Plate, American Steel Hoop, American Sheet Steel, American Steel and Wire, and National Tube. The new company had everything from iron ore, coal, steamship lines, railroads, and steel mills, right through to finished products. The 78 blast furnaces had an annual capacity of 7,400,000 tons of pig iron, or about half of the total in the United States. Of finished steel, the various plants could deliver about 7,700,000 tons per year.

Against this aggregation of assets the company was capitalized as follows:

Bonds	\$304,000,000
Preferred stock	550,000,000
Common stock	550,000,000
	<hr/> \$1,404,000,000

For the Carnegie Company there was paid the original selling price of \$400 million plus a block of common stock subsequently added so that the total was approximately \$492 million. Carnegie took his share entirely in bonds and received about \$225 million.

While this was a great accomplishment for Morgan, the event did not escape criticism. As thus launched the United States Steel Corporation was burdened with a heavy capital load. It was not the conservative, down-to-the-rails financing for which James J. Hill was noted. A great

organizing job remained to be done. A multitude of plants must be integrated into an effective whole. Strong-headed, two-fisted steelmakers must be welded into an effective executive staff. Outside businessmen observed the enterprise with some skepticism.

Subsequent developments served to confound these critics. Elbert H. Gary as head of this new industrial giant was able gradually to integrate its properties and perfect its management. The soaring demand for steel products in the twentieth century enabled the company to develop earnings commensurate with its capital. The Mesabi iron ore deposits and the Frick coking coal beds proved of enormous value. Morgan's vision and courage had been justified.

As far as Andrew Carnegie was concerned the sale of his company to the United States Steel Corporation was the final chapter of his great adventure in the field of business. It is related that shortly after completion of the deal he called on Morgan before leaving for the Riviera to say: "Now, Pierpont, I am the happiest man in the world. I have unloaded this burden on your back and I am off to Europe to play."¹⁰ This statement might well have been challenged. Carnegie did not appreciate how happy his retirement had made some of his competitors!

THE ELECTRIC AGE

THE years from 1870 on were fruitful for the minds of men bent on discovering what makes the universe tick. Self-taught American engineers were coming to understand and apply some startling rules of natural phenomena. They began better to perceive the qualities of that mysterious thing called electricity, which Morse had successfully put to work about a generation before with his telegraph. By virtue of these discoveries, within a short span of years our people were given the telephone, electric lighting, and electric power.

Important in this connection was America's centennial year, 1876. During these twelve months Alexander Graham Bell exhibited his crude telephone apparatus, Charles Francis Brush began work on a dynamo for arc lighting, and Thomas Alva Edison opened his miracle-producing laboratory at Menlo Park, New Jersey.

The development of electric lighting followed two sharply differentiated channels. The first to be successfully worked out was the arc light, produced by passing an electric current across the small gap between two pencils of hard carbon. The other, more familiar to us of today, was the incandescent light, achieved by directing a current through a filament of some fine, highly resistant medium enclosed in a sealed glass tube or bulb. Brush, Wood, Thomson, and Houston were active in perfecting the arc light. Edison was the inventor of a practical system of incandescent lighting.

The phenomenon of the electric arc was not a new discovery. Beginning with Sir Humphrey Davy, as early as 1801-1809 a series of scientists in Europe had begun to speculate about its nature. Its application for lighting necessarily awaited the development of a practical means of generating electric power. Davy and his immediate successors were limited to the pitifully small currents obtained from voltaic batteries. Had the science rested there, we should not have known an electric age.

The doors of a new world were opened in 1831 when Michael Faraday,

English bookbinder turned physicist, unlocked the secret of the induced electric current. "One form which this experiment took was that of rotating a copper disk, between the poles of a powerful electric magnet. He then found that a conductor, the ends of which were connected respectively with the center and edge of the disk, was transversed by an electric current. This important fact laid the foundation for all subsequent inventions which finally led to the production of electromagnetic or dynamo-electric machines."¹ Faraday had come upon the basic principles of the modern electric generator and the electric motor.

Faraday's discoveries inspired the minds of other scientists. In 1858 F. H. Holmes built a magneto generator sufficiently workable to be installed in the Dungeness lighthouse. Some years later Dr. Antonio Pacinotti evolved the theory of ring winding for armatures. Finally, in 1870, Z. T. Gramme, working independently, produced a practical ring-wound dynamo and shortly made it self-exciting. By these steps the generation of electricity was taken out of the field of mere laboratory experiment and made available for commercial use.

One of the first applications was in arc lighting. A Russian army officer and a young American engineer led in this development. In 1876 Paul Jablochkov, experimenting in Paris, had invented what was called an "electric candle," consisting of two carbon rods placed side by side to yield a small arc between their exposed tips. That same year in Cleveland, Ohio, a vigorous young mind endowed with the curiosity which frequently spells genius was giving thought to this same idea.

Charles Francis Brush, a recent graduate from the University of Michigan, undertook to build an effective dynamo and practical arc light. His employer, George W. Stockly of the Cleveland Telegraph Supply Company, assisted him with the understanding that if Brush were successful, the supply company would manufacture and sell arc lights in addition to its regular line of electric bells and telegraph instruments.

Within a few months Brush produced a good dynamo and somewhat later an arc light in which the arc was automatically controlled. When he tried to operate several such lamps in a series he encountered the obstacle that if one light failed, the entire current went out. Brush, realizing the necessity of solving this problem, tackled it with all his energy. He succeeded. Within two years he developed a regulating shunt coil which would by-pass the flow of current around a disabled lamp. This accomplishment opened the way to central station operation. Such was the birth of electric lighting in America, achieved through the groping experiments of an inexperienced engineer with the assistance of a little venture capital from the still very new telegraph industry.

From this time onward the pace accelerated. Scientists, mechanics, and businessmen began experimenting with arc lamps. For this purpose, Thomson, Houston, Wood, and others made crude little dynamos, first for demonstration and then for commercial use. In 1878 John Wanamaker's store in Philadelphia attracted great crowds to a window featuring an installation of arc lights colorfully described at the time as "miniature moons on carbon points, held captive in glass globes."²

Meanwhile Edison with a group of associates in Menlo Park had undertaken a series of experiments looking toward the invention of an electric light operating on the incandescent principle. With the help of Grosvenor P. Lowrey, a New York lawyer, the Edison Electric Light Company was organized and financial backing provided for Edison's work. The target of his research was to secure a practical filament for incandescent lighting and a means whereby its illuminating life could be prolonged. After months of disheartening experiment, success was finally attained. "Edison's invention was practically made when he ascertained the theretofore unknown fact that carbon would stand high temperature, even when very attenuated, if operated in a high vacuum, without the phenomenon of disintegration."³ On October 19, 1879, an incandescent bulb containing a filament of carbonized cotton thread started a continuous run of some forty hours. Edison and his little group of workmen were thrilled. Well they might have been. This invention was one of man's greatest achievements in applied science. The business world shortly would embark on great new enterprises as Edison's little incandescent light was carried into millions of homes and to remote corners of the earth.

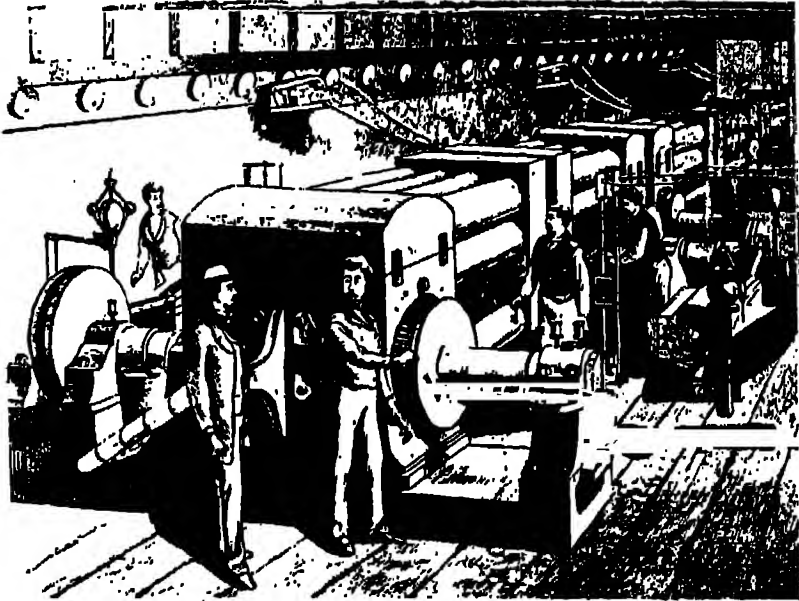
Adding drama to these achievements was the competition which developed between the two basic systems, the arc lamp and the incandescent bulb. The former, of course, was earlier in the field. The first concern to offer a public electric lighting service was the California Electric Light Company in 1879, employing Brush arc-light equipment. Late in 1880 the Brush Electric Light and Power Company installed arc lamps for about three-quarters of a mile along Broadway in New York City. This met with great popular interest.

Concurrently there was organized in December of 1880 the Edison Electric Illuminating Company of New York, which undertook to install an Edison system for buildings in lower New York. This first commercial application of the incandescent light called for comprehensive pioneering work. Not only did Edison perfect the incandescent light bulb, he also designed and manufactured his own dynamos, current-carrying conduits, standard bulb sockets, and current meters. These early workers in electric-

ity had to be at once both theoretical and practical. They must invent, improvise, manufacture, and apply.

This system for the "First District" was to be the crucial test for Edison. While he was struggling with his problems there was the Brush arc light installation on Broadway to taunt him with its success.

It was all so new and the paths so uncertain that for Edison and his associates trial and error was the only method. Much of it was error. Take the case of the inadequately insulated conduits under the New York streets.



The dynamo room of Edison's Pearl Street station

Courtesy of the Thomas Alva Edison Foundation

One day when these were being tested a thoroughly alarmed passerby ran to Edison's men shouting, "Your electricity has got into the pavement up in Fulton Street and all the horses are dancing."⁴ Actually this was true in one spot due to a leakage of current.

When the time came, on September 4, 1882, to turn on current for the full system the suspense was great. All the work of Edison and his associates for the long trying years hung in the balance. Was their brain child, the incandescent bulb, about to open a new industry, to light shops and homes all over the world? Or would their rival, the arc lamp, be the illuminant of the future?

Well, it worked! The fragile, odd-looking, small glass bulbs lit up the quarters of some fifty-nine proud but somewhat astounded customers. These included Drexel, Morgan & Co., the Herald, the Times, and Sweet's restaurant on Fulton Street. Edison had proved the commercial practicability of his system. This was the same year that Rockefeller launched his Standard Oil Trust erected on a base of lighting by oil lamps. Could John D. have foreseen that Edison's strange little glass gadget was destined to push oil lighting into the back woods he might have lost some of that equanimity for which he was famous.

It is interesting to note that not only was Drexel, Morgan & Co. among Edison's first customers but also that partners of the firm became financially interested as well. Morgan and associates subscribed \$500,000 of the \$1 million needed to start an Edison company for uptown New York and also took part in financing the Boston Edison Company.

At this time a couple of New England businessmen became interested in electric lighting. Silas A. Barton and Henry A. Pevear of Lynn, Massachusetts, succeeded in bringing together a small group which included Charles A. Coffin as well as Professors Thomson and Houston. In 1883 they formed the Thomson-Houston Electric Company and having purchased the American Electric Company of New Britain moved its small factory to Lynn. This concern was the direct ancestor of the great General Electric Company of today.

Both arc lighting and the Edison incandescent system met with growing success. Installations were made in stores, plants, and communities all over the country. Cities vied with one another to become early possessors of an electric system of lighting. Prominent citizens throughout the country considered it a legitimate boast that their homes and offices were illuminated with a few incandescent bulbs strung in a primitive manner from walls or ceilings. The Brush Company and Thomson-Houston, each of which had first concentrated on arc lighting, gradually took up incandescent systems as well.

While the business of installing lighting systems was sweeping the nation, technological advances likewise made great strides. One of the most far-reaching of these was the adoption of alternating current for common usage. As in the case of the two basic systems of electric lighting, this also precipitated a great competitive battle commonly referred to as the "War of Currents" between those who had faith in the use of alternating current and their opponents like Edison who nailed their flags to the mast of direct current.

Direct current had been employed both for the arc and incandescent systems in the early installations. Yet its use involved certain restrictive

technical limitations. With the low voltage employed economical transmission of power was not possible for distances beyond a few miles. Obviously this was a serious obstacle. Consequently both here and abroad a few inquiring minds were speculating about the possibility of greater flexibility in that still mysterious thing—the alternating current.

Among these were two Americans who were to make important contributions to this new cause, George Westinghouse and William Stanley. Westinghouse in Pittsburgh had already attained prominence for his achievements in the field of the railroad air brake, transmission of natural gas, and machinery manufacture. Stanley, a young man not yet in his thirties, had one of the ablest technical minds of the period. Both had become enthusiastic about the prospects for alternating current.

The crux of the problem was to perfect a device for conveniently raising and lowering voltages, depending upon whether the current was undergoing transmission or being used for lighting. A Frenchman, Gaulard, and an Englishman, Gibbs, had already worked out such a transformer. Westinghouse acquired the American rights to their patents and sent Stanley into the quiet of the Berkshires to experiment with improvements. He was successful and the year 1886 saw the first installation of an alternating-current lighting system. At Great Barrington, Massachusetts, Stanley installed his transformers, first to raise a 500 volt current to 3000 volts for transmission, and then to reduce it to 500 for lighting. Thenceforward the Westinghouse Electric and Manufacturing Company was to grow with the industry and to become one of the industrial giants of the twentieth century. A few years later Stanley established his own company at Pittsfield, Massachusetts. Meanwhile the issue of direct versus alternating current precipitated bitter controversy. Edison's followers loudly denounced alternating current as dangerous to life and unfit for common usage. In this they were wrong. Gradually the application of alternating current spread as its greater flexibility and equal safety became apparent.

While the installation of electric lighting systems was sweeping the country another development had occurred which did not receive proper acclaim at the time. This was the introduction of the electric motor. As we have already noted the first interest of our people was in using electricity as a source of lighting. That it could also be employed as a source of power aroused only secondary attention.

In early work with the dynamo an extraordinary fact was discovered. It was found to possess a dual personality. If instead of turning the armature by outside mechanical power to produce a current of electricity, the process were reversed and a current of electricity from another dynamo introduced into the armature, the latter would revolve and mechanical

motion become the end product. The weird device was at the user's option either a generator or an electric motor.

One of the first persons in the United States to adapt this dynamo-in-reverse or electric motor to practical work was a young engineer, Frank J. Sprague, who had been assisting Edison in perfecting a lighting system at Brockton, Massachusetts. Sprague was carried away with this new conception of transmitting power over wires to turn remote wheels and operate distant machinery.

Accordingly he withdrew from the Edison organization and launched a business enterprise to commercialize electric power as a motive force. This was the Sprague Electric Railway and Motor Company which sponsored the industrial debut of the electric motor in New England textile factories. More challenging to Sprague, however, was the field of traction, as it had also been to other enthusiasts such as Edward M. Bentley, Walter H. Knight, and C. J. Van Depoele. In this field Sprague made a distinguished contribution by overcoming many technical problems and by putting into operation a successful trolley car system at Richmond, Virginia, in February, 1888. Thenceforth the expanding use of electric motors for transportation and for turning factory wheels would show a growth similar to that of electric lighting.

These were great developments all to occur within the short space of about a decade. There was something of strong imaginative appeal in this new field of electricity. It was natural therefore that it should attract the attention of many inventors. Thus a growing confusion developed in connection with patent rights, especially those relating to the incandescent light.

Edison had consistently maintained that his patent on incandescent lamps was exclusive. Nevertheless Thomson-Houston and various small manufacturers were making and selling them in aggressive competition with the Edison Electric Light Company. Smarting under the ill effects of this situation Edison brought suit for infringement against the United States Electric Lighting Company in 1886. After several years of delay and hearings of extraordinary length the United States Circuit Court of Appeals in October, 1892, confirmed Edison's contentions. It declared his patent on the incandescent light involved original discovery and was supreme.

There were other areas in which patent questions arose and posed ever-growing problems. It had gotten so that neither the Edison General Electric Company, nor the Thomson-Houston Company, nor for that matter any of the manufacturing companies, could offer complete and effective installations without raising questions of patent infringement. The situa-

tion was so confused and practice so competitive that progress was threatened.

Conditions of this kind almost invariably lead to steps for better organization. As we have already noted the last two decades of the nineteenth century were characterized by a broad movement of concentration over the whole industrial front. The new electrical manufacturing industry was to provide no exception to this trend. It yielded one of our most famous and successful corporate consolidations—the General Electric Company.

Even before the Edison patent litigation was concluded, tentative confidential negotiations were going on between the Edison General Electric Company and the Thomson-Houston interests, looking toward merger. The usual bugbear of such transactions hung this one up for almost a year—the question of comparative valuation. Finally, as a result of the patient efforts of Hamilton McKay Twombly and Charles A. Coffin, a deal was worked out.

The General Electric Company was incorporated in April, 1892, to take over the Edison Company capitalized at \$15 million and the Thomson-Houston Company at \$10,400,000. Combined annual business was in the neighborhood of \$21 million. This was just a scant ten years since Edison and his little group of associates had turned on the current for incandescent lighting in New York's First District. When the consolidation was effected Edison retired from active participation in its business affairs to apply himself to research where his real interest lay. The new company had strong financial connections and its Board of Directors included J. P. Morgan, D. O. Mills, Henry L. Higginson, T. Jefferson Coolidge, and F. L. Ames. Likewise in the management and engineering staffs were included men later to become recognized leaders in the electrical field, such as Charles A. Coffin, Charles P. Steinmetz, S. Z. Mitchell, Samuel Insull, and Dr. Thomas Addison.

This merger had all the earmarks of success. It had brought together the best that we possessed in engineering, production, management, and finance. Scarcely one year after its launching the strength of the company and the capacity of its management were put to crucial test. The panic of 1893 caught the company unprepared and vulnerable. Had it not been for the resourcefulness of Mr. Coffin as President and the courage of its bankers, this enterprise might have expired in infancy. Their problem was the natural outcome of a new industry which had grown too fast. The idea of electric lighting had taken hold so strongly that both purchasers of equipment and its manufacturers had been carried away with enthusiasm. Almost every community in the country wanted some form of electric lighting or a street car system. Many of them refused to bother to assemble

adequate financial resources. In the scramble for business both the Edison Company and the Thomson-Houston Company had extended credit to the bursting point. From shaky little local electric companies they had accepted notes and stocks in payment for equipment. More serious was the fact that they had endorsed notes of struggling companies. When the stress of 1893 came many of these could not fulfill their obligations. Such defaults pyramided upon the new General Electric Company. Under the strain of panic banks were demanding payment. With current liabilities of over \$10 million including upwards of \$3 million of endorsed paper and with only about \$1,294,000 in cash the company faced a serious situation.

Confronted by these necessities Coffin proposed an unusual plan. The General Electric Company had something over \$12 million par amount of the stocks and bonds of local electric companies taken in part payment for equipment. He proposed to offer these securities to General Electric stockholders at one-third the stated value, such option to be exercisable when the country's financial difficulties ceased to be critical. Meanwhile the company's bankers underwrote this offering for an immediate advance of \$4 million. The new General Electric Company was thus given the means that enabled it to survive the panic of 1893. Thereafter credit policies of the company were more realistically adjusted to the capacity of customers to pay.

The early nineties also witnessed another great event in the growth of the electrical industry. This was the construction of our first large hydro-electric project. For almost half a century engineers and businessmen of western New York State had been searching for means to utilize the titanic power of Niagara Falls. It was easy enough to harness this power at the site with water turbines. The real problem was how to make it available for a broader field. Various solutions were proposed. One intrepid adventurer even planned a mammoth drive shaft to run across the upper part of the state from which factories from Buffalo to Syracuse would get power.

As our engineers began to understand the principles of the electric generator and the transmission of electric current, it became apparent that we had at last come upon a practical method for making Niagara power useful over wide areas. Accordingly the Niagara Falls Power Company was organized under the sponsorship of men like William Rankine, Francis Lynde Stetson, and J. P. Morgan. Much scientific controversy developed concerning the particular manner of generating and transmitting current. Even the great English scientist, Lord Kelvin, was consulted. In the end a keen competitive race resulted between General Electric and Westing-

house. Finally the Cataract Construction Company awarded the contract to Westinghouse for the installation of three turbogenerators of over 5000 H.P. each.

The job of building a transmission line to Buffalo was given to General Electric. When completed the enterprise provided the country with the new pattern of modern power generation and distribution. The current was generated at Niagara at 2000 volts and was raised to 10,000 volts for transmission over twenty-six miles of wire to the city of Buffalo, where it was stepped down in voltage to be used for electric lighting, trolley cars, and factory power. A major triumph had been achieved. Henceforth power was to be freed from the binding limitations of local application. It would be produced where most economical and taken over slender copper wires to distant homes and factories. No other industrial accomplishment better sets off this miraculous age from those which went before than the coming in of the modern electrical industry.

THE TELEPHONE

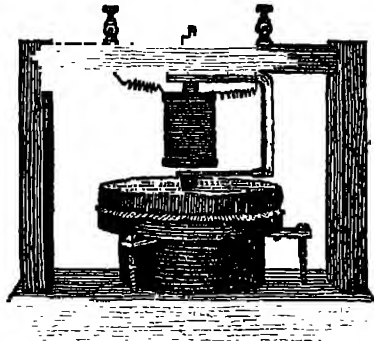
Financing Bell's Invention

THE lot of the venture capitalist is frequently not a happy one. Back in the spring of 1875 there were two in the State of Massachusetts who were worried. Gardiner G. Hubbard of Cambridge and Thomas Sanders of Haverhill had been backing a young professor of "vocal physiology" in his experiments to perfect a so-called "harmonic telegraph." The would-be inventor was Alexander Graham Bell. The cause of worry was that Bell had so many revolutionary inventions crowding his mind that these conservative New England capitalists thought he would never concentrate on any one long enough to complete it. When Bell would murmur something about his idea of transmitting the human voice over an electric wire, they told him to stick to his knitting and complete the harmonic telegraph. Bell, however, unwittingly circumvented them. He concentrated on the harmonic telegraph only to produce the telephone.

On a sultry day in June, 1875, in a stuffy garret at 109 Court Street, Boston, Massachusetts, Bell and his assistant, Thomas A. Watson, were tinkering with a telegraphic device which, using the principle of sympathetic sound vibrations, was to send six or eight simultaneous messages over one telegraph wire. Progress was not encouraging. Even Bell's abundant enthusiasm had reached a low ebb. Then, inadvertently, Watson made an unusual adjustment of the transmitter spring so that instead of the interrupted current they had been using there was maintained an unbroken one. When Watson caused this spring to vibrate in the unbroken circuit over the pole of its electromagnet, Bell at the receiving end caught the sound with his extremely sensitive ear for pitch. He cried out, "What did you do then? Don't change anything. Let me see!"¹ What Bell saw confirmed the idea which had so long tormented him. "If I

could make a current of electricity vary in intensity, precisely as the air varies in density during the production of a sound, I should be able to transmit speech telegraphically.”² Bell knew that if one sound could be sent over a wire, others could likewise be transmitted. This incident in the experiment with the harmonic telegraph provided Bell with the key to the telephone. The subsequent development of an instrument in crude form for both transmitting and receiving took time but did not raise insurmountable problems.

In early 1876 the scene shifted from Bell's workroom in Boston to the nation's capital. Here in the prosaic atmosphere of the Patent Office two totally unrelated series of events affecting the telephone converged.



Bell's first telephone transmitter
Courtesy of the American Telephone and
Telegraph Company

For several years Elisha Gray, a trained electrician, had been working on his theory of the electric transmission of electrotones and musical tones. On February 14, 1876, believing he had successfully solved the problem, he filed at the Patent Office a *caveat* for the invention of a telephone. Great was his consternation to discover that just a bare two hours before Alexander Graham Bell had filed a patent application. Letters patent were granted to Bell. Gray was denied.

In October of 1876 Bell proved the practicability of his telephone over a two-mile telegraph wire between Boston and Cambridge, owned by the Walworth Manufacturing Company. The excellent results were the subject of a leading article in the *Boston Advertiser*. Bell and his associates were now convinced that they had an invention of practical value. Obviously, however, they had no conception of its potentialities because we find Gardiner G. Hubbard offering it for the sum of \$100,000 to that great

giant of the telegraphic world—the Western Union. Much was their chagrin when officers of that company rather superciliously declined the offer. Within two years these same officers were of a different mind, for the telephone patents were worth millions. Then they were not for sale.

About this time Bell, who had drawn heavily on Sanders and Hubbard, was finding it difficult to pay the expenses of further experiment and perfecting of apparatus. He chanced, however, upon a slender source of revenue. In Salem he had given a lecture demonstrating the new apparatus. Bell and his gadget were a sensation. Soon lectures were scheduled in other cities, always playing to capacity.

The routine was simple but effective. Several of the telephone instruments were placed at various points in the hall as well as on the stage, somewhat as we do radio amplifiers today. These would be connected with some existing telegraph line and the faithful Watson, stationed some five or six miles away, would shout and sing into a transmitter. At a signal Watson would render "Hold the Fort," "Auld Lang Syne," or "Do Not Trust Him Gentle Lady." Perhaps a cornetist would play. The results would be moderately audible to the audiences which were thrilled at the seeming miracle. From these lectures came the first trickle of telephone revenue.

In April of 1877 the first line exclusively for telephone use was built for Charles Williams Jr. of Boston. Others were demanded as people saw the advantages of this great forward step in the field of communications. Before long these single lines grew into networks connected through a simple central switchboard. In January, 1878, the first commercial telephone exchange was opened in New Haven, Connecticut. The public acceptance of the new device surprised even Bell and his associates. Licenses were granted to local companies for installing Bell telephones. Prospects seemed rosy.

Into this promising scheme of things there was suddenly thrown a wrench of no mean proportions. A bitter business war started. The officials of the Western Union had come to the conclusion that they had made a bad mistake in turning down the "toy" which Gardiner Hubbard had offered them. Either that or they had played the game which is frequently thought smart and not rarely proves to be the reverse of allowing the other fellow to do the pioneer development work. In any event Western Union decided to enter the telephone field. They formed the American Speaking Telephone Company and commissioned Thomas A. Edison to invent a transmitter.

Now the picture changed with startling suddenness. Edison fulfilled his undertaking with such success that his transmitter was considered an improvement over Bell's. New telephone business began to go to the

Western Union Company. Furthermore the latter company started to carry open warfare into Bell's own territory. Western Union bought control of certain local companies which were operating under Bell licenses. Things were looking rather grim for the Bell infant.

CITY HALL, LAWRENCE, MASS.
Monday Evening, May 28

THE MIRACLE

TELEPHONE
TELEPHONE

WONDERFUL DISCOVERY

OF THE AGE

Prof. A. Graham Bell, assisted by Mr. Frederic A. Gower, will give an exhibition of his wonderful and miraculous discovery The Telephone, before the people of Lawrence as above, when Boston and Lawrence will be connected via the Western Union Telegraph and vocal and instrumental music and conversation will be transmitted a distance of 27 miles and received by the audience in the City Hall.

Prof. Bell will give an explanatory lecture with this marvellous exhibition.

Cards of Admission, 35 cents
Reserved Seats, 50 cents

Sale of seats at Stratton's will open at 9 o'clock.

Facsimile of advertisement of a Bell lecture. At the outset this was the only way Bell could turn his invention to profit.

Courtesy of the American Telephone and Telegraph Company

Then another turn of the Wheel of Fortune occurred. Francis Blake brought to the Bell Company a transmitter which was not only an improvement on their own but an effective answer to Edison's. The little

company again took the offensive. Suit was vigorously carried on against Western Union for infringement of the Bell patents. This engagement was settled by a conclusive victory for the Bell interests in November, 1879. Western Union capitulated. An agreement provided that they would stay out of the telephone business and Bell would not engage in telegraph work. Bell was left dominating the telephone field.

The financial and corporate record of these developments is one of almost kaleidoscopic change as a result of the enthusiasm which greeted the telephone and the rapidity with which it was adopted. At the outset, in February, 1875, there was simply an informal agreement under which Hubbard and Sanders agreed to put up money for Bell's experiments. Interest in patents and profits were to be shared equally three ways. Later Bell's patents were assigned to this group—Bell, Hubbard, and Sanders. This was the second step and the group which later included Watson came to be known as the "Bell Patent Association."

As the business grew a more formal organization was indicated. Accordingly a declaration was filed in Massachusetts for the Bell Telephone Company, Gardiner G. Hubbard, Trustee. The patents were assigned to Mr. Hubbard and the "Patent Association" ceased to exist. In August of 1877 a total of 5000 shares were issued to Bell, Hubbard, Sanders, and Watson in a ratio of roughly 30 per cent each for the first three and 10 per cent for Watson. During this early promotional period Sanders was putting up most of the capital and staked his fortune in the sum of about \$110,000 on the success of the enterprise. That took courage.

In these formative years a business policy was laid down which became basic and was partly responsible for the later operating efficiency and prosperity of the American Telephone and Telegraph Company. This was the practice of leasing equipment rather than selling it. In these early years great pressure was exerted on Hubbard to sell instruments as this would have brought in a larger initial revenue. The new enterprise needed money desperately. However, Hubbard stood fast for his principles and insisted upon maintaining the policy of supplying equipment only under a leasing arrangement. His convictions on this subject had been derived from his experience as attorney for the Gordon-McKay Shoe Machinery Company. In that concern he had observed that the practice of leasing permitted a more effective maintenance control, developed a more intimate relationship with users, and in the end yielded higher aggregate profits.

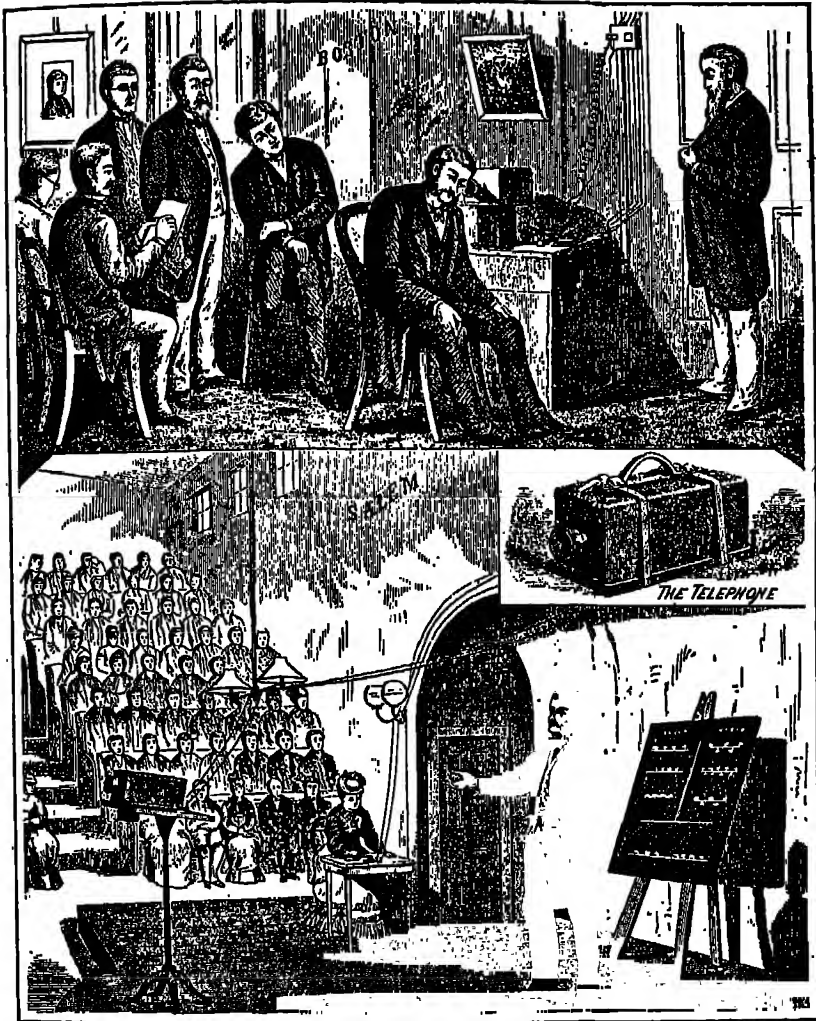
All this time the pressure of new business was mounting. People wanted the telephone in spite of its crude state. An early advertisement stated that telephones could be installed for distances up to twenty miles and

that "Conversation can easily be carried on after slight practise and with the occasional repetition of a word or sentence. On first listening to the telephone, though the sound is perfectly audible, the articulation seems to be indistinct, but after a few trials the ear becomes accustomed to the peculiar sound and finds little difficulty in understanding the words."

Growing business of course spelled the need for more capital. The first move in this direction was negotiated by Sanders early in 1878. He interested some fellow New England capitalists in putting up money for the further development of telephone companies local to that territory. The New England Telephone Company was formed and capitalized for \$200,000. One half of this stock was sold to raise \$50,000 in cash and the balance went to the Bell interests as consideration for an exclusive right to operate under Bell patents in the New England States. Subsequently a series of corporations were formed as the business grew and additional capital was needed.

When the Western Union war was on in 1879, there took place an important reorganization. William H. Forbes and associates were put in control. This was a crucial period and in order to secure the adherence of new capital it had been necessary to concede to Forbes and his associates equal voting rights with the patentee stockholders. This was accomplished in a rather singular way. A by-law passed in January of 1879 provided: "The holders of one-third of the stock for which money has been paid and subscribed shall, for the space of two years, have an equal right and power with the holders of the two-thirds reserved to the patentees . . ." Forbes proceeded to consolidate all Bell interests, except for two patents, in one concern, the National Bell Telephone Company, launched in February, 1879, with a capital of \$850,000.

This new set-up was of but short duration. In November of 1879 the Western Union finally had been worsted as a telephone competitor, leaving the Bell Company to dominate the field. Business converged on its offices in Boston from all parts of the country. More money was needed. Furthermore a new situation developed which called for prompt solution. With the telephone, as later happened in the case of electric lighting, it became necessary to extend long-term credit to local operating companies when equipment was installed. This was done by accepting their bonds and stock in part payment. However ordinary corporate charters did not permit one corporation to own stock in other corporations. Early in 1880 the Bell interests secured a special enabling act from the Legislature of the State of Massachusetts which authorized the incorporation of the American Bell Telephone Company endowed with holding-company powers and with an



The Scientific American of March 31, 1877 illustrates a Bell Lecture at Salem with messages sent from Boston

Courtesy of the American Telephone and Telegraph Company

authorized capital of \$10 million. Its stock was exchanged for that of its predecessor, the National Bell Telephone Company.

Hardly had this step in corporate organization been completed when another problem began to press for solution. By this time the interconnection of telephones through local exchanges had become standard practice.

"Hello Central" was a familiar expression to many Americans. Now, however, it became increasingly apparent that telephone service was needed between one local system and others—either near or distant. The country was demanding long-distance service. This new phase required additional funds. An application to increase the capital of the American Bell Telephone Company was refused by the State of Massachusetts. Therefore in 1885 the American Telephone and Telegraph Company was incorporated under the laws of the State of New York for the specific purpose of building long lines to interconnect local systems.

Growth of both local and long-distance service constantly called for money—and more money. In order to facilitate expansion, a major reorganization took place in 1900 which recognized the increasing importance of the interconnecting, over-all service. The subsidiary, American Telephone and Telegraph Company, took over its former parent, the American Bell Telephone Company, by an exchange of stock. This step resulted in the intercompany pattern which has since prevailed. Thus today the American Telephone and Telegraph Company, more familiarly A. T. & T., controls or is associated with companies charged with providing local and interconnecting service within certain prescribed territories. The parent company continues to afford long-line service. The subsidiary, Western Electric Company, manufactures equipment for the system and Bell Telephone Laboratories Inc. carries on extensive research work. In addition the operating companies are advised on business, operating, accounting, and legal problems. The aggregate is a highly integrated organism.

Although the telephone business has been preeminently the story of the Bell system, the contribution of independent companies has not been negligible. On the contrary they have assisted materially in this great advance in our methods of communication. Today there are upwards of 6,000 independent telephone companies. Most of them are admittedly small but, together with separate rural lines, they account for something like 20 per cent of all our telephones.

As this industry got into the stride of its mature years it became necessary for us to abandon some of our ideas in regard to competition. It had previously been taken for granted that in this field as in others a reasonable amount of competitive rivalry would work to the public benefit. A number of our communities therefore permitted the establishment of two different telephone companies. As a result the public subscriber found it necessary to install both systems in order to have a complete service. This was both costly and unsatisfactory. Furthermore it frequently meant that neither company was prosperous. Recognizing this situation Congress in 1921 passed the Graham Act which permitted consolidation of competing tele-

phone companies irrespective of a possible conflict with the Sherman Anti-Trust Law.

This whole record of telephone development in the United States constitutes a proud achievement. Bell's invention was basic and opened a new era in communication. Gray, Edison, Blake, Pupin, and many others enabled us to keep in the forefront of technical progress. Also, from the business point of view, the Bell system was the beneficiary of considerable talent. Men like Gardiner Hubbard, William H. Forbes, Theodore N. Vail, and Walter S. Gifford set up and carried forward sound and high standards of operating practice. They established a business mechanism capable of rapid expansion and prompt adjustment to technological advances without sacrificing conservative principles of finance. Similarly our rate-making authorities had the wisdom to permit earnings adequate to provide for capable personnel, carrying on of extensive research, maintenance of advanced standards of service, and a fair return on capital.

Our acceptance and broad application of this new means of communication was dazzlingly rapid. No other nation even approximated the results. It is now only about seventy years since the first commercial telephone was installed; since Bell was giving vaudeville-like exhibitions in order to raise funds; and since Thomas Sanders at Haverhill was wondering whether the capital he had ventured would ever pay a dividend. Today the system which started so precariously operates over 30 million telephones. Its more than 700,000 stockholders have an interest in a company with assets of nearly \$9 billion doing an annual business of upwards of \$2 billion and paying \$189 million in dividends.⁴

Such a phenomenal growth could only have been predicated upon an important contribution to the whole economy. Even putting aside the great advance in the convenience of living, what this development has meant to the American business system cannot even be approximated. Every day of every year since the 1880's our businessmen and their customers have enjoyed facilities of telephone communication far beyond those afforded in any other country. Since 1892 when long-distance service between New York and Chicago was inaugurated, they have benefited from a growing long-distance service which today not only covers the United States but most large cities of the world as well. All of this has contributed to acceleration of business turnover which, of course, means greater volume, lower costs, and a higher standard of living.

BUSINESS MACHINES

As our textile factories, blast furnaces, steel mills, oil refineries, electric industry, and transportation system began to spread a greater abundance, new problems arose. Not the least among them was the fact that we needed quicker and cheaper ways of doing office work. If we were to produce goods in quantity and distribute them at low cost, we required something better than the slow manual processes of accounting and record keeping which had prevailed almost without change for centuries. Responding to this, our inventors and entrepreneurs produced devices which revolutionized age-old practices. In the brief period from 1870 to 1900, our businessmen were given the typewriter, the adding machine, the calculator, the cash register, and a whole range of tabulating and recording devices.

There was nothing particularly new in the mechanical principles involved. Some can be traced back over many generations. An adding machine was worked out as early as 1642 by the French philosopher, ascetic, and mathematician, Blaise Pascal. Taking up where Pascal left off, the German philosopher-mathematician, Gottfried Wilhelm Leibnitz, in the 1670's invented a machine which would multiply, divide, and extract roots as well as add and subtract. Then we find a jump of about a hundred and fifty years to 1820 when Charles Xavier Thomas of Colmar, France, adopting some of the Leibnitz principles, brought out the first calculating machine to find commercial application. It performed the four basic mathematical operations.

From the Colmar appliance stemmed our own adventures in this field. It seems that shortly after 1870 Frank Stephen Baldwin had observed in a St. Louis office a Colmar machine or one built on its pattern. That this device of French derivation should be found in St. Louis is appropriate when one recalls the strong French influence which prevailed in that former trading post. In any event Baldwin, struck by the potentialities of this device for the business world, devoted his efforts to

bringing out an improved calculating machine. In 1874 he exhibited his "arithmometer" at the Franklin Institute in Philadelphia.

In those days the lot of the bank or office clerk was pretty grim. He spent dreary hours perched atop a high stool endlessly adding long columns of figures, striving for the elusive balance. Days might be wasted because of some slight mathematical error or mistake of penmanship. Among this fraternity of pen-and-ink figure jugglers was one who reacted adversely to the labor imposed. William Seward Burroughs, a bank clerk of Auburn, New York, began to rack his brain for some way of adding and subtracting at less cost in the sweat of the brow. He deserted the high stool and bulky ledgers to devote himself to the development of an adding machine. He went to St. Louis and worked in a machine shop where, oddly enough, he met Baldwin who was still experimenting with his calculating machine. Burroughs finally succeeded and in 1886 the American Arithmometer Company was launched to make and sell the Burroughs adding machine.

About the time that Baldwin and Burroughs were revolutionizing book-keeping, another business need was making itself felt. This stemmed from the haphazard methods then prevailing of handling cash from retail sales. Clerks often were careless, poorly paid, and sometimes dishonest. A merchant had no way of knowing that the cash turned in corresponded with merchandise sold. Among those trying to find a solution to this problem was James J. Ritty of Dayton, Ohio. When on board a steamer for Europe, he chanced to observe the large dial in the engine room which indicated the revolutions of the ship's propeller. Why not use such a device to register retail sales? If customers and managers could see a recording as sales were made, it would act as a deterrent to carelessness and dishonesty. In 1879 Ritty invented an appliance to carry out his thoughts—our first cash register.

Unfortunately Ritty encountered the same kind of trouble which has harassed so many inventors and businessmen pioneering in a new field. Although there was a real need for this appliance public acceptance was cold. What was needed was aggressive salesmanship. There was a hard shell of customer resistance to break down. Old-school merchants had to be shown patiently and practically. Clerks resented a device which apparently reflected on their integrity. Fortunately a businessman with a flair for salesmanship was at hand.

John H. Patterson, who had been using some of Ritty's machines in his store, saw a great future for the cash register. He and his brother bought the assets of the little company that was trying to sell Ritty's device and in 1884 launched the National Cash Register Company. At the outset

the going was not easy. Capital was hard to come by. Although they were putting their best efforts into the new business, its first years of operation resulted in a deficit. But Patterson kept driving away at his selling problems. At the same time he strove to improve the device. Slowly but surely the cash register began to win friends. Distribution was broadened and manufacturing procedures perfected. Finally profits began to roll in and the little company of dubious future in 1884 became a business success. Prosperity bred further success and it was not many years before the cash register was accepted as an essential appliance wherever retail sales were made both in the United States and in many foreign countries.

Of even broader significance was the coming in of the typewriter. It was not only to stimulate our economy but was to work a great social change as well. Like the adding machine, its family tree was a long one. As early as 1714 a patent was granted by Queen Anne to Henry Mill, an engineer in England in the following terms:

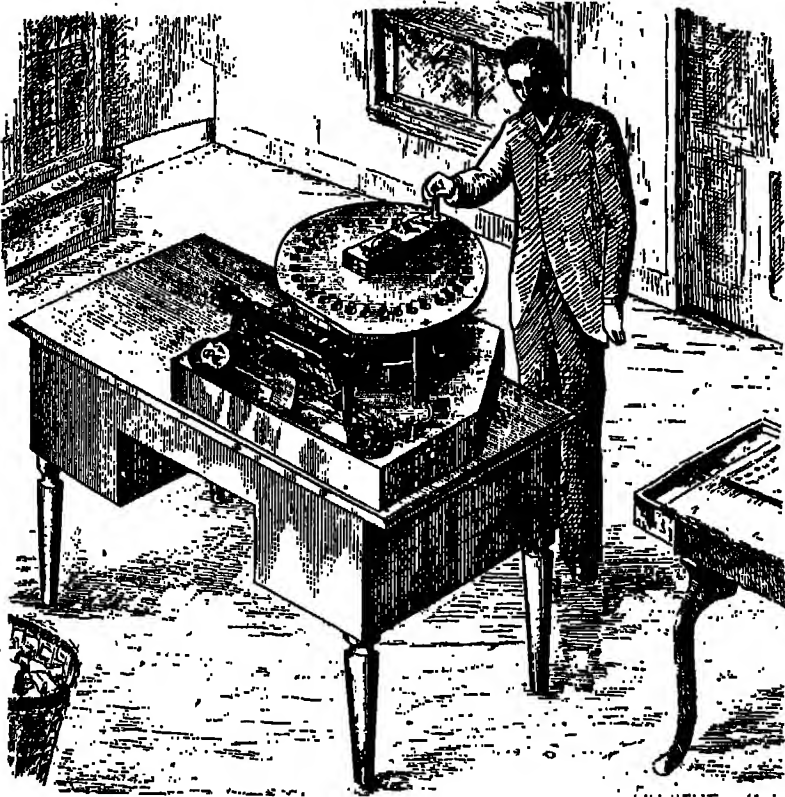
Anne by the grace of God, &c., to all to whom these presents shall come, greeting.

Whereas our trusty and wellbeloved subject, *Henry Mill*, hath, by his humble petition, represented unto us, that he has by his great study, paines and expence, lately invented and brought to perfection "*An artificial machine or method for the impressing or transcribing of letters singly or progressively one after another, as in writing, whereby all writings whatsoever may be engrossed in paper or parchment so neat and exact as not to be distinguished from print . . .*"¹

Whatever the merit of Mill's appliance, it was not until over a century later that our own patent office records the invention of a writing machine. In 1829 Andrew Jackson signed a patent in favor of William A. Burt of Detroit for a machine in which the type was arranged in fixed positions on a segment of a circle. Four years later in Marseilles, France, one Xavier Projean produced what he described as a "kryptographic" machine. This was apparently the parent of the modern typewriter as it was built upon the principle of separate type bars set in a circle but so adjusted that each type struck a common center.

Following these early experiments there was a long series of inventors who tried to bring the idea of mechanical writing into practical application. None succeeded until Christopher Latham Sholes of Milwaukee, former printer and newspaperman, together with a few associates brought out a machine which not only wrote well but also rapidly. He christened it the "typewriter." Struggling against repeated discouragements through the years 1867-1873, Sholes finally perfected his machine, secured patents, and gave the world the first commercially successful writing machine.

Among those who worked with Sholes was James Densmore. Densmore played an important role both in supplying venture capital and in promoting the new enterprise. As we have already seen in the case of the cash register, the invention of a practical device does not alone make it successful. There are in addition basic business problems to be solved—manufacturing and selling.



Early groping toward the typewriter

The Growth of Industrial Art, Benj. Butterworth, United States Patent Office

Densmore took what most businessmen would regard as a practical step. Instead of attempting to set up a new manufacturing plant, starting from scratch, he sought the assistance of one of the most experienced concerns in the field of fine machine work. In 1873, taking Sholes' latest model, he went to Ilion, New York, to try to interest the officers of E. Remington & Sons. This concern had achieved distinction during the Civil War by making guns in quantity for the Union armies.

The Remington people were considerably impressed and agreed to undertake the manufacture of Sholes' typewriter. In the early months of 1874 the first practical typewriter, "Model I Remington," was put on the market. It is reported that Sholes sold his interest to Densmore for \$12,000. He may well have done so. Although this was his brain child, Sholes was bothered by the thought that while it might arouse curiosity because of its novelty, public interest might soon wane. In any event, title to the invention soon passed to Remington under an agreement providing royalties for Densmore.

As a matter of fact early sales did not reflect great enthusiasm. Soon the Remington people realized that they had undertaken an arduous task. Although this improvement was later to revolutionize business practice, businessmen were slow to sense its possibilities. The time-saving element in its use was not readily apparent. Public interest was only mildly aroused, although visitors to the Centennial Exposition in Philadelphia in 1876 paid 25¢ apiece for samples of typewritten script.

Accordingly during the first years sales efforts were directed not toward businessmen but rather to court reporters, clergymen, editors, and authors. An exhibit of one of the early machines in Boston landed a distinguished customer—Mark Twain.

When asked for a testimonial endorsement, he wrote a classic. As published it read: ²

HARTFORD, March 19, 1875

GENTLEMEN:

Please do not use my name in any way. Please do not even divulge the fact that I own a machine. I have entirely stopped using the Type-Writer, for the reason that I never could write a letter with it to anybody without receiving a request by return mail that I would not only describe the machine but state what progress I had made in the use of it, etc., etc. I don't like to write letters, and so I don't want people to know that I own this curiosity breeding little joker.

Yours truly,

SAML. L. CLEMENS

While technical improvements in the machine and its manufacture posed difficulties, they were solved without particular embarrassment. The actual selling involved a twofold problem. It was first necessary to break down the thought habits of generations and to open up the minds of skeptical purchasers who were prone to remark, "Why pay \$125 for this gadget when a penny pen will do practically as well?" And after a sale was made it then was necessary to train an operator.

All this was a prototype of many similar problems which we were to encounter in the twentieth century as we evolved a whole range of me-

chanical gadgets and appliances. The science of salesmanship was carried way beyond the mere offering of goods. Advanced technical, educational, or engineering services were also supplied. This distinctly American adjunct to selling helped to spread our products throughout the world.

Like many ultimately successful projects that of introducing the typewriter on a broad scale had to wait upon a fortunate concurrence of the unexpected. The delay however was not long. Typewriter people began to perceive that there was at hand a technique that would render the new writing machine much more useful. This was that manifestation of the age-old practice of symbol writing known as shorthand. Before the introduction of the typewriter shorthand had been employed only by some court reporters and commercial clerks. There were a few so-called business schools in which the system was taught. In launching the typewriter, Sholes, Densmore, Yost, and others were only vaguely aware of a possible relationship with shorthand. It took time for even the most imaginative to sense the deep importance of this partnership. But once understood there no longer remained any question about the future of the typewriter.

During the years that saw the introduction of the cash register, the adding machine, and the typewriter, other inventions were being given practical application. One of the most important of these was the automatic system of compiling, recording, and tabulating devised by Dr. Herman Hollerith. As a statistician in the Census Bureau at Washington he had been struggling under the burden of manually compiling the huge mass of data that had been taken in the census of 1880. The process was so slow that it began to look as though it would be time for a new census before the results of the old one had been digested.

In digging into this problem Dr. Hollerith produced a solution that has given us a system of compiling and recording of importance not alone to business but to science and government as well. By 1887 he had worked out his ideas in practical form. Punched cards were used to register the collected data. Varying arrangements of holes were employed to indicate different classifications and fluctuating detail. Then these cards were run through a machine in which electric mechanisms were actuated depending upon the particular arrangement of holes in each card. A hole in the same position in two different cards produced identical mechanical results. Thus all figures could be counted and data recorded by predetermined classifications.

Again the mere invention of these appliances did not assure success. It was necessary to continue research, make improvements, manufacture

skillfully, and market intelligently. In carrying out these functions the International Business Machines Corporation has been a leader.

Taken in the aggregate, the economic and social consequences of our development of business machines were far reaching. These appliances were comparatively speaking low in price and found broad usage. Their contribution to the march of commerce was great. By improving methods of communication and accelerating business turnover they enabled the distribution of goods to keep pace with quantity production. Their use resulted in lower costs. They were an essential concomitant to the assembly line.

As with farm machinery and the sewing machine, American manufacturers were again to lead the world. Within a few years after we had introduced these devices to our own market we extended their sale to principal foreign countries. Startling as were the machines themselves, our methods of selling were perhaps even more revolutionary. Into the staid atmosphere of London, Paris, Berlin, and Vienna went resourceful American salesmen carrying the new technique of educating-training-selling. Schools for stenographers were opened alongside venerable banking and business institutions whose officers prided themselves on the fact that they were still doing office work as their ancestors had done. Wherever trade was carried on, there were found our typewriters, cash registers, or adding machines to make its doing easier. Within fifty years after the introduction of the typewriter to the American market it had been adapted to some one hundred and fifty different languages or dialects including Gaelic, Sanskrit, Aztec, Russian, Burmese, and even Quoc-Ngu.

Great as were these business achievements, consequences of a social nature were even more noteworthy. The typewriter and to a lesser degree other business machines opened a new door for women in their struggle for economic equality. We have already observed their entrance into factory work in the cotton textile industry of New England. The typewriter however brought them into business on a higher level. It broadened the horizon of opportunity for women of nearly all nations. Hundreds of thousands were thus to find much needed personal incomes. Universal suffrage was advanced. The charming and overly modest Sholes—to whom more than anyone else we are indebted for the typewriter—expressed this well as he was nearing the last of his days: "Whatever I may have felt in the early days of the value of the typewriter, it is obviously a blessing to mankind, and especially to womankind. I am glad I had something to do with it. I builded wiser than I knew and the world has the benefit of it."³

FINANCIAL ADVENTURES

Railroad Chieftains at War; Panic of 1907

THE advent of the twentieth century signaled the coming in of a new order in our business life. The country emerged into an advanced stage of industrialization. Production was concentrated and its volume vastly increased. Applied science swept forward with breathtaking velocity. Electrical power was put into broad use. The motor car became a practical reality. Aviation, radio, and the movies were on the horizon. Even as to the old order things were changed. Concepts became more daring. We performed on a grander scale.

Among those to assume a big role on this stage in 1901 was a capitalist newcomer endowed with ambition, courage, and the capacity for making one dollar beget prolific offspring. Edward H. Harriman, former Wall Street broker, had snowballed his holdings of railroad stocks until, by well-calculated steps, he had come to control the great Union Pacific and through it that other transportation empire, the Southern Pacific.

Those were still days of rugged individualists and ruthless business warfare. Government had ordained particularly that there should be competition among the railroads. To this injunction our railroad men responded fully. It was all a lusty battle royal with survival only for those who could take, as well as give, punishment.

As Harriman surveyed the areas of railroad strategy west of the Mississippi, he realized that he faced formidable adversaries. The venerable railroad builder, James J. Hill, had constructed and now controlled the successful Great Northern running from St. Paul to Seattle. Together with J. Pierpont Morgan, he ruled the parallel Northern Pacific. All three of these powerful interests were specially concerned with the rich traffic area lying between Kansas and Missouri in the South and the Dakotas and Montana in the North. Of course, this was in addition to the control of traffic between Chicago and the Pacific Coast.

While Hill and Morgan had for years been working as a team, Harriman had gone it alone. Nor did he seem properly to respect the hunting grounds of the two old chieftains. With little ado, Harriman set out to buy control of the Burlington (Chicago, Burlington, and Quincy Railroad) which served a fine traffic territory in Nebraska, Iowa, and northern Illinois, effectively complementing eastern stretches of the Union Pacific. The Burlington was one of the best managed and most profitable roads in the country. Its directors were not responsive to Harriman's approach. In fact he was brusquely turned down.

Meanwhile Morgan and Hill had come to the conclusion that they must secure the Burlington in order to provide the Great Northern and Northern Pacific with an effective artery between their terminals at St. Paul and the great traffic gateway, Chicago. They were not unmindful that such a move would checkmate Harriman. Perhaps Hill was a better negotiator or it may be that he talked bigger numbers than Harriman. At any rate, in the spring of 1901 a deal was concluded by which Morgan's Northern Pacific and Hill's Great Northern bought some 97 per cent of the outstanding stock of the Burlington for roughly \$215 million paid for in joint collateral trust bonds of their two roads. When Harriman learned of the negotiation, he demanded a one-third interest for the Union Pacific. This was abruptly refused. "Very well," Harriman is reported to have said, "it is a hostile act and you must take the consequence."¹

Nor was this newcomer indulging in mere braggadocio. Harriman planned a secret raid into enemy territory which for outright audacity has rarely been equaled. This was nothing less than the attempt to buy control of the Northern Pacific in the open market, right under the noses of the two old warriors, Morgan and Hill. If successful he would thus control a half interest in the Burlington. Daring as this scheme was, Harriman missed by only the breadth of a hair.

What happened was this. Shortly after consummation of the Burlington purchase, Morgan embarked upon one of his perennial trips to Europe. Hill went back to railroading in the Northwest. They had attained their objective. The Great Northern and Northern Pacific now controlled a route into Chicago. All seemed set for a new period of peace and prosperity. In their wildest imaginings they had not supposed that anyone would attempt such a bold stroke as Harriman was now up to.

Quietly, skillfully, and with great secrecy, Harriman and his bankers, Kuhn, Loeb & Co., began buying Northern Pacific stock in large blocks. In so doing they ran up the market both in the preferred and in the common. This was interpreted by the public as simply reflecting undue optimism over the results of the Burlington acquisition.

The Hill-Morgan forces had dropped their guards. Some of them were now caught in as neat a trap as had ever been sprung south of Fulton Street. Thinking that the strong market in Northern Pacific securities offered a nice chance to reap a profit, they sold with the idea that later they could repurchase at lower levels. Unwittingly, they were selling into Harriman's bag.

The first to scent trouble was Hill. One day, out in Seattle, as reports of continued large transactions in Northern Pacific reached him, he was suddenly struck with suspicion. Could that Johnny-come-lately, Harriman, be doing a little night-raiding behind the Hill-Morgan lines? It still seemed incredible but ——?

With Morgan in Italy, Hill decided he must do some reconnaissance and quickly. He ordered a special train from the Great Northern. The engineer was told: "The road is yours to St. Paul; everything else on the line will be held up to let you pass."²

On arrival in New York on Friday, May 3, 1901, Hill went at once to enemy headquarters. He called on Jacob Schiff at Kuhn, Loeb & Co. and asked what the shooting was all about. Schiff frankly admitted that Harriman was seeking control of the Northern Pacific and had already acquired large holdings. Hill decided that the situation was desperate and cabled Morgan for support in buying 150,000 shares of Northern Pacific common at the market. This amount would ensure their control of the common stock.

At this crucial point, Saturday, May 4th, occurred the slip that is said to have cost Harriman the battle. He was home ill and much worried about his position. His buying had been in both the preferred and common stocks of the Northern Pacific, each of which had voting power. He had a majority of the total shares but lacked a majority of the common. The preferred was callable and, although his lawyers assured him that control of the aggregate was adequate, he feared that if Hill and Morgan had control of the common they would be able to call the preferred, thus defeating the Harriman plan.

On Saturday morning, therefore, Harriman phoned Kuhn, Loeb & Co. to purchase 40,000 more shares of common at the market. When this was referred to Schiff who was attending a service at the synagogue, he took the responsibility of holding up the order until he could confer in person with his client. Meanwhile Harriman assumed the order had been executed.

This was a critical misunderstanding because when the market opened Monday the hard-riding Hill was in control. Morgan had cabled approval of the buying campaign and the Hill-Morgan interests took all stock that

was offered. By Tuesday afternoon they had acquired the needed 150,000 shares of common to give them upwards of 52 per cent. In so doing they had run the price up from 110 to 149%. Whatever the reasons, the Harriman-Schiff interests remained quiescent during those two days.

At this point, after the close of the market on May 7th, the embattled financial powers relaxed, each side believing it had achieved victory. Harriman and Schiff, knowing that preferred and common stocks had equal voting power, relied on the fact that of the total they held a bare majority. Hill and Morgan not only controlled the common stock but the board of directors as well and proposed to call the preferred shares before Harriman could vote them. As far as the principals were concerned they thought the fracas was over. Neither the public nor many people in the financial district knew what had been going on.

But the real fireworks were yet to come. The next few days were to see the Northern Pacific "corner" and panic, one of the strangest adventures in the history of that hectic market place, Wall Street. Ironically enough it was the smart, sophisticated traders who trapped themselves.

These speculators had become convinced that Northern Pacific stock was grossly overvalued at 148-49 and that it would soon fall back to former levels. A merry jamboree was held in selling it short in mounting quantities. When, however, they tried to borrow stock to make deliveries on the short sales, they found themselves naked in a barrel of hornets. Little if any stock was available. A stampede started to buy shares in the market. Of course only small amounts were coming out because the big powers held tightly to what they owned. Northern Pacific instead of going down went up in maddening jumps. Trader outbid trader. Brokers lost all reason in offering to buy at any price. On Thursday, May 9th, Northern Pacific sold at \$1000 per share. Other good stocks were dumped willy-nilly, sacrificed at any figure, to procure funds to pursue Northern Pacific in its upward soaring. The nation watched with growing apprehension because panics in security dealing frequently signaled business depressions.

At this point constructive forces in Wall Street intervened to prevent disaster. Time for delivery of Northern Pacific shares was extended and settlement with either Kuhn, Loeb or Morgan was allowed at a price of \$150 per share. A banking group organized a \$20 million credit for emergency loans. Calm was restored almost as quickly as the "panic" had started. Little damage had been done except among the speculative fraternity. These men had reason to recall the day with shudders for years to come.

As the excitement subsided, the principals in the battle for Northern Pacific control began to appraise their respective rights more realistically.

Neither had in fact won a complete victory. Morgan and Hill were in the saddle and their last trump, that of calling the preferred, looked good. On the other hand, to play it meant a long legal battle with Harriman. After all the hurly-burly, peace now beckoned alluringly. A ground for

MORGAN AND HILL WIN FIGHT.

KUHN-LOEB INTERESTS OFFER TO SELL TO N. P. SHORTS
AT 150 AFTER PRICE HAD GONE TO 1,000.

A DAY OF WILD PANIC IN THE STOCK MARKET.

HEAVIEST LOSSES IN PANIC HOURS.

	High.	Low.	Decline.		High.	Low.	Decline.
Amalgamated Copper.....	111	70	25	New-York Central.....	155	140	15
Achison common.....	75	43	25 1/2	People's Gas.....	111	88 1/2	22 1/2
do preferred.....	98 1/2	70	28 1/2	Rock Island.....	184	125	59
Baltimore and Ohio.....	102	64	18	St. Paul.....	215 1/2	154	61 1/2
Burlington.....	103	174	15	Southern Pacific.....	40	20	20
Delaware and Hudson.....	105	105	00	Texas and Pacific.....	44	27	17 1/2
General Electric.....	220	200	20	Union Pacific.....	113	70	27
Louisville and Nashville.....	103 1/2	70	27 1/2	United States Steel com.	47	24	23
Manhattan.....	120	88	27	do preferred.....	65 1/2	50	15 1/2
Missouri Pacific.....	103	72	31				

The fight for control of Northern Pacific is over. It has been won by the Hill-Morgan syndicate.

Jacob H. Schiff, head of the firm of Kuhn, Loeb & Co., issued a statement last night that Northern Pacific shorts who could not deliver the stock could buy it of that firm for 150.

This, it is believed, will restore the tone of the stock market to-day, after some inevitable flurries over the quick shift in the price of Northern Pacific, which closed last night at 325.

Northern Pacific went to 1,000 on the Stock Exchange yesterday, and a disastrous panic was only averted by postponement of delivery for twenty-four hours and by the action of certain banks, which raised a fund of \$10,500,000 to be loaned at market rates.

Stocks generally underwent enormous shrinkages, and great losses were inflicted on the speculating public. Only four brokers were forced to suspend.

It was announced late last night that the loans made by the associated banks and J. P. Morgan & Co. would not be called to-day and that the rate of interest would be marked down to below yesterday's prevailing rate.

New York Tribune, May 10, 1901

compromise was found. On May 31, 1901, the Big Chiefs sat around a table at the Metropolitan Club in New York and in courteous equanimity passed the pipe of peace.

The treaty provided that Harriman would go on the Burlington board and he with some of his friends would be elected to the Northern Pacific board. In the competition between Harriman's Union Pacific and Hill's

Northern Pacific, the Burlington was to be neutral. Furthermore the Burlington was not to be extended to the Pacific Coast without Harriman's consent. The Northern Pacific Preferred was to be retired on January 1, 1902. It was not a bad settlement.

This story of railroad magnates struggling to control the Burlington has an important sequel. Both Hill and Morgan, gentlemen of usually imperturbable disposition, had been rudely jolted by the near-miss of the Harriman raid. In their minds they cast about for some means of preventing a repetition of such an untoward incident.

A proposed solution was almost immediately forthcoming from Hill's resourceful brain. He suggested to Morgan that a holding company be formed to take over their respective holdings in Great Northern, Northern Pacific, and through the latter in the Burlington. Subsequently, in discussing the incident, Hill stated: "We were particularly anxious to put a majority of that stock (the Northern Pacific) where it could not be raided again as it had been. . . . We were advised that it would be safer with the shares held by an investment company, the stock of which could only be held by individuals, or by corporations that were not railway companies, and to that extent we would be more free from such raids as had been made by the Union Pacific interests, so-called." *

Accordingly, on November 12, 1901, the Northern Securities Company was formed. Its capital of \$400 million was at that time considered gigantic. Hill and Morgan agreed to turn their holdings of Great Northern and Northern Pacific into the Securities Company in exchange for its shares. A similar opportunity was given to other stockholders of those two roads. The result must have been gratifying to the engineers of the new plan because there was delivered to the Northern Securities Company about 76 per cent of Great Northern stock and some 96 per cent of Northern Pacific, included in which were the Harriman-Union Pacific holdings. Hill was made the company's first president and its board was divided, six for Northern Pacific interests, four for Great Northern, three for Union Pacific, and two chosen at large.

Such consummation was enough to make the sponsors of the scheme purr with content. Once again Hill and Morgan thought they could relax, with their interests secured behind an impregnable barrier. The troublesome Harriman had been taken into camp, given a place at the table, and was behaving with disarming good manners. Respite however was brief. A storm blew up from a totally unexpected quarter.

Public reaction to the formation of Northern Securities had not been favorable. People were suspicious of these great new aggregations of capital. The well-remembered adventures of such ruthless speculators in

railroad shares as Drew, Fisk, and Gould had bred distrust. It was difficult for the uninitiated to distinguish between those old Hell-for-leather stock operators and the new school of railroad capitalists of constructive purpose such as Hill, Morgan, and Harriman. Furthermore to the farmer-shipper out on the prairies, this pooling of somewhat competing railroad interests, seemed a threat which boded ill. The whole thing cut athwart a traditional policy of government, competition between our carriers.

Hence within two months after this corporate mastodon, the Northern Securities Company, had been born, the State of Minnesota started suit against it as an illegal combination. Moreover there was in the White House a man whose verve for trust-busting kept him almost constantly on the trail, President Theodore Roosevelt. On March 10, 1902, the federal government brought suit against the Northern Securities Company, Great Northern, and Northern Pacific on charges of having violated the Sherman Anti-Trust law.

The issue became a *cause célèbre* and was carried to the United States Supreme Court. By a five to four decision, in March of 1904, the Court held that the formation of the Northern Securities Company did in fact violate the Sherman Anti-Trust Law. Such a conclusion, although opposed by such eminent jurists as Mr. Justice White and Mr. Justice Holmes, placed judicial imprimatur upon the government's policy of attempting to protect the public through activating railroad competition. Within sixteen years we will find this theory showing signs of strain as Congress and the Interstate Commerce Commission sought consolidation of our carriers.

It thus became necessary to dissolve the Northern Securities Company. To do this however raised a neat and unexpected issue. It was one which brought the Hill-Harriman rivalry again into full flame. Should the stockholders of the Securities Company be given their simple pro rata share of the holdings of both Northern Pacific and Great Northern or should they get back in kind the stock which they had originally contributed. In the latter alternative Harriman's interest would again threaten control of the Northern Pacific. Naturally Hill and Morgan favored the pro rata formula which would reduce Harriman's share of Northern Pacific by reason of his receiving a large block of Great Northern. Here was a howdy-dol

Issue was joined in the courts and the case taken by Harriman to the United States Supreme Court which decided against him in favor of pro rata distribution. Instead of controlling the Northern Pacific, the Union Pacific now became a large minority stockholder. It also received a sizable block of Hill's Great Northern. This was the final skirmish in the

lusty, hard-hitting campaign by Harriman to secure control of or a voice in the management of the Burlington.

On the field of grand strategy Harriman had lost. Financially, however, this adventure yielded a large profit to the Union Pacific. Within a year or so, aided by a speculative fever in stocks, most of Union Pacific's holdings of Great Northern and Northern Pacific were sold to yield a net profit of about \$58 million. Of nostalgic interest is the fact that in those days there was no capital gains tax!

This surge of stock speculation, which enabled Harriman to cash in so successfully for the Union Pacific, was the forerunner of an important series of events. It led directly to the money panic of 1907. In turn, it was the banking debacle of this crisis which finally convinced our bankers and the government that it was essential to organize the nation's banking system more effectively. From this came the passage of the Federal Reserve Act in December, 1913.

The ten years preceding 1907 had been for us both prosperous and expansive. We benefited from a worldwide advance in the general price level as the gold mines of South Africa spewed forth a stream of yellow metal. Immigrants were coming to us in a rising tide which, from 1905 to the outbreak of World War I, reached the enormous figure of about one million a year. This meant that each twelve months we were adding to our population roughly the equivalent of two cities the size of Boston, Baltimore, or St. Louis (1890 census).

Furthermore these years saw the last great period of railroad extension. From 1890 to 1916 about 100,000 miles were built. Manufacturing facilities were being modernized, integrated, and consolidated. The steel industry was booming. Our exports were growing and we enjoyed a favorable balance in foreign trade which was running at the rate of almost \$500 million per year. We were producing bumper crops. There was much reason for optimism.

Optimism, however, is something which feeds upon itself, to turn without conscious recognition into speculative excess. So in these years immediately preceding 1907 we began to discount the future. Stock prices were bid upward and bank credit prodigally extended. Rumors of great mergers served to accelerate speculation. Only some barely distinguishable storm warnings were discernible. Money was getting tight. Commercial paper ruled between 5% and 6 per cent. Call-money rates were erratic, ranging from 1 per cent to 16 per cent.

Early in 1907 stock prices had a sharp sinking spell but recovered during the summer. Then one of the great speculators of those times got caught with his tail in the door. F. Augustus Heinze, who had accumulated

a large fortune in copper stocks, became over extended. On October 16th his firm was unable to meet its obligations. The public was still blithely unaware of the imminence of real trouble. So it was as a bolt from the blue that on October 22 a run started on the Knickerbocker Trust Company in New York City. This spread the next day to some other New York trust companies. Call money went to 125 per cent. Alarm struck through the nation. Runs began on many banks. The panic was on.

That trust companies should have been the first victims of the public stampede was in keeping with the times. Theirs had been a particularly rapid growth during the prosperity swing which started in the mid-nineties. The functions that these institutions performed related intimately to the new industrial economy just coming into being markedly to characterize twentieth-century America. They acted as trustees for bond issues and registrars for stock issues. For the large fortunes and estates which were being rapidly built, these institutions offered more lasting administrative facilities than the time-honored method of individual trustees. Operating under state charters and state regulation, the trust companies enjoyed wider scope and investment opportunity than our national banks. This was particularly true in regard to real estate financing. Favored by such conditions, these "department store banks" flourished and many new institutions were born. In the boom period they had been overly expansive in their operations.

This so-called "rich man's panic" of 1907 struck hard and struck fast. From the outset it was plain that the whole banking fabric of the nation was threatened. If the stampede were allowed to gain headway, banks would go down like dry timber before a forest fire. "At once the inelastic system of the old national bank act showed its defects. The banks had no central bank of issue to turn to, and most of them, deeming their fifteen or twenty per cent cash reserves as sacred, rather than as resources to be used in such cases of emergency as these, tightened up, pulled in their strings and refused to pay out cash freely. Stock exchange values fell with a crash. Call loans became frozen, and the banks fell back on the old and always disturbing device of clearing-house certificates." 4

Thus it became apparent to our banking fraternity that they must organize forthwith to stop the panic. Leadership in this hurried mobilization was unanimously accorded to that elder statesman of American finance—J. Pierpont Morgan. Together with George F. Baker and James Stillman, a general staff was constituted to fight down the forces of fear and the philosophy of devil-take-the-hindmost. President Theodore Roosevelt sent his Secretary of the Treasury, George Cortelyou, to New York to

confer with this group and to lend what assistance the Treasury might properly give.

Too late to save the Knickerbocker Trust, which quickly closed its doors, it was decided to make an all-out defense around the second point of attack, the highly regarded Trust Company of America. It was sent \$12 million, to be paid out freely by special tellers in an attempt to allay depositor apprehension.

Morgan assumed personal direction of the battle. This was his last adventure of the kind and he once again displayed the qualities which had won him his position. He not only gave of himself but was unstinted in the use of his firm's resources. The G. H. Q. was established in the famous Morgan Library.

. . . "A more incongruous meeting place for anxious bankers could hardly be imagined: in one room—lofty, magnificent—Tapestries hanging on the walls, rare Bibles and illuminated manuscripts of the Middle Ages filling the cases; in another, that collection of the Early Renaissance masters—Castagno, Ghirlandaio, Perujino, to mention only a few—the huge open fire, the door just ajar to the holy of holies where the original manuscripts were safeguarded. And, as I say, an anxious throng of bankers, too uneasy to sit down or converse at ease, pacing through the long marble hall and up and down the high-ceilinged rooms, with their cinquecento background, waiting for the momentous decisions of the modern Medici." ⁵

In handling the crucial banking situation in New York City, it was decided that the trust companies must organize to sustain one another and that the clearing house banks would assume the defense of other flanks. Within a few days it became obvious that much more money would have to be laid on the counter at the Trust Company of America if its run were to be stemmed. Morgan proposed that the other trust companies subscribe a fund of \$25 million for this purpose.

A meeting of trust company presidents was called. Morgan presented to them a subscription form to sign in which they were to pledge their institutions for sums prorated according to respective resources. This was bold action. The assembled officials were not accustomed to going over the top under fire. Nor had they been used to working together. None volunteered to sign. Finally Morgan selected Edward King, President of the Union Trust Company, called him up to the table and, pointing to the agreement, said: "There's the place, King, and here's the pen." ⁶ This broke the log jam. King signed, the others followed, and the \$25 million was subscribed. The Trust Company of America was saved but not until some \$30 or \$35 million was paid out to depositors.

In the meantime shooting had started in another quarter. The drastic collapse of security prices brought one of the leading brokerage houses of Wall Street to the verge of failure. The firm of Moore & Schley were carrying for themselves and customers a bale of the stock of the Tennessee Coal, Iron & Railroad Co. It had been the object of keen speculation, and much of it had been pledged for bank loans. The stock was of unproven investment quality. With the banking situation chaotic and security prices tumbling, it was not surprising that loans secured by Tennessee stock were called. Unable to procure further credit, Moore & Schley's position as a large Wall Street house created a critical problem. Its failure would undoubtedly precipitate that of other brokerage firms and might involve some of the banks which already were fighting a nip-and-tuck battle. Thus another panic problem was dropped into the hands of the Morgan-Baker-Stillman rescue party.

For this difficulty there was seemingly only one solution. A buyer had to be found for a lot of Tennessee stock who would at once bail out both the banks and Moore & Schley. With the security markets a shambles this was not easy. The solution which was finally reached was one which later provoked much unreasoned criticism. The United States Steel Corporation was induced to take over the Moore & Schley holdings of the Tennessee Company common stock as well as those of any other stockholders who wished to sell.

The closing of this deal, like the bank rescue work, had its dramatic aspects. Apparently there was divided opinion among the members of the board of directors of the Steel Corporation not only as to the wisdom of buying this stock but also as to its value. "The financial situation was a seething volcano," and the finance committee of the Steel Corporation met continuously from Friday, November 1st, to Sunday the 3rd. They were in constant touch with the Morgan group which was still struggling with the critical Trust Company of America problem. Finally on Sunday an agreement was reached. The Steel Corporation would acquire the Tennessee stock subject to one proviso. This condition was that the whole deal should be approved by President Roosevelt. Judge Gary, head of the Steel Corporation and himself an able lawyer, was well aware that because of the vast size of his company, any acquisition of competing interests might later be attacked under the Sherman Law. The leading "trust-buster" of the country was of course the President himself.

Accordingly on Sunday night, a special train was hurriedly put together on which Judge Gary and Steel Corporation Director Frick took off for the Capital. Early the next morning they went directly to the White House, interrupting the Chief Executive at breakfast. Gary and Frick

explained the deal to President Roosevelt, Elihu Root, Secretary of State, and William Loeb, the President's private secretary. A special long-distance telephone circuit was held open to connect with the Morgan group in New York. A tense situation in the nation's financial capital hung upon the President's decision.

This was promptly forthcoming. Roosevelt declared that while he possessed no legal authority to approve such a plan, he saw no reason why the federal government should oppose it. That was as much of a blessing as Gary and Frick could expect. The Steel Corporation would purchase the Tennessee stock. Word was immediately phoned to Morgan in New York and given out by him. It came as a revivifying breath of mountain air to a financial community groggy from worry and fear. This, with the conclusion of the arrangement assisting the Trust Company of America, turned the tide of panic. Gradually order was restored.

Fortunately this banking and monetary crisis was not followed by a severe or prolonged business depression. As the summer of 1908 progressed, production began to revive and security prices advanced. Crops were good and their values touched new high levels. We had weathered the storm but by a narrow margin. The banking system had been kept functioning only by heroic efforts. The shock of this misadventure served a constructive purpose. Bankers and businessmen all over the country began to take thought.

XXXIII.

THE HORSELESS CARRIAGE

Ford—Man with an Idea

TO UNDERSTAND the automobile industry during its first twenty-five years one must think primarily of growth—of hectic, unpredictable, incredibly rapid, growth. Of turbulent expansion that continually called for millions in new capital, mushrooming plants, armies of new workmen, and fabulous quantities of material. Of a daemon of growth that constantly seemed to be treading on the heels of the leading manufacturers as though they were laggards in progress.

For broad purposes of comparison, this business stood at zero in 1900, although in that year some 4000 little "horseless carriages" had been put together. A short twenty-five years later it had become our leading manufacturing industry. We were then producing at the rate of over 4 million cars and trucks per year, valued at retail in the neighborhood of \$4 billion. About an equal sum was being spent each year by our people to keep some 20 million cars and trucks running and pay the incidental taxes. By 1926 the capital investment in the industry was \$2 billion. Ford had spurned an offer of \$1 billion for his company. General Motors had become the leading manufacturing concern in volume of profit with more than \$186 million reported for the year 1926. All of this practically within a quarter of a century.

A striking aspect of the industry in those early days was that it was pre-eminently the field of the small businessman, or more accurately that of the small independent mechanic. Our big manufacturing concerns and men of great capital, with rare exception, failed to sense the rewards which were beckoning. Sophistication had dulled their perceptions. Typical of this attitude was the advice given by Chauncey M. Depew to his nephew who wanted to invest \$5000 in the start of the Ford Motor Company:

"Nothing has come along to beat the horse. Keep your money. Or, if

you must spend it, buy a horse and you'll have enough left over to furnish it with feed for the rest of its life."¹

Having followed such admonition, that the nephew did not commit mayhem upon the person of Uncle Chauncey was without doubt the ultimate in self-restraint. With this type of skepticism prevalent, it remained for the unknown little fellow, thinking things out for himself and working from the grassroots up, to sense that something new and great was involved in the much-ridiculed "horseless carriage."

While the growth of this industry was peculiarly an accomplishment of the twentieth century, the idea of a self-propelled road vehicle was of course not new. Leonardo da Vinci designed one to be propelled by a clockwork mechanism. In 1804 Oliver Evans drove through the streets of Philadelphia his steam-powered "Oruktor Amphibolos." Down through the nineteenth century engineers here and especially in England experimented with steam-driven cars for highway use.

The real awakening of American interest came with the advent of the internal combustion gasoline motor. This had its start in Germany during the 1880's when Gottlieb Daimler and Carl Benz succeeded in building small vehicles powered by four-cycle gasoline engines of the type previously worked out by their fellow countrymen, Dr. N. A. Otto and Dr. Eugene Langen.

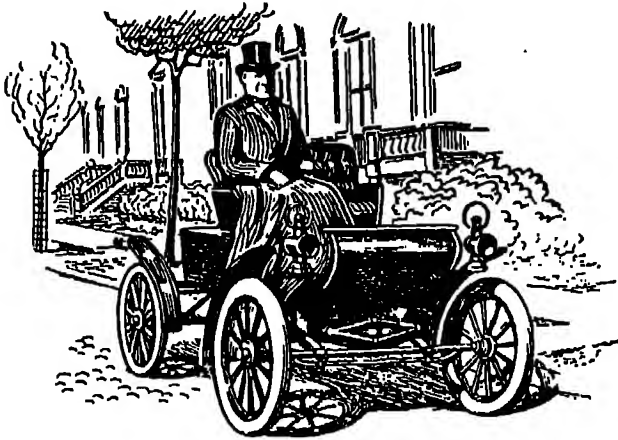
Within a few years our own engineers and inventors began experimenting in the construction of crude small "gas buggies." The first was apparently one built by Charles E. Duryea, a New Englander, in 1892. Then the idea caught fire in many places. Haynes, Olds, Winton, and Ford, each working independently, succeeded in building various combinations of the light road carriage and internal combustion gasoline motor.

These inconspicuous events heralded the coming in of our greatest manufacturing business. Its birth was humble. Basically it stemmed from the union of small machine shops with local venture capital. Outstanding among early companies of such lineage was the Olds Motor Works of Detroit. In 1901 they produced a car which made motor history. This was the famous Oldsmobile runabout, a one-cylinder car selling for \$650. It was designed with a curious curved dashboard something akin to the front of an old horse-drawn sleigh. It was our first low-priced car to be produced in quantity.

The founder of this enterprise was Ransom E. Olds of Lansing, Michigan. He had been trained as a practical mechanic in his father's machine shop, where crude gasoline engines for farm and marine use were made. As a side issue, Ransom experimented with a self-propelled road vehicle. He built several powered with steam in the years 1887-1891 but shortly

thereafter turned to the use of the gasoline motor. In 1897 Olds put together his first Oldsmobile—now a prized exhibit at the Smithsonian Institution.

Shortly thereafter occurred a seemingly unimportant event which may have determined the later territorial centralization of this new industry. It was decided to move the Olds business from Lansing to a larger center. The East missed a great opportunity. Olds considered various sites, including Newark, New Jersey, but found eastern capital cold to this strange and unpredictable venture. On the other hand, Fred L. Smith of De-



Although Chauncey M. Depew had belittled the horseless carriage at the outset, we find him in 1904 the proud operator of one of the curved-dash Oldsmobiles

The Turning Wheel, by Arthur Pound, Doubleday, Doran & Company, Ltd.

troit, already one of Olds' backers, prevailed upon him to locate in that city. Their success and the resulting high profits made Detroit bankers and businessmen definitely motor-minded. Of the little Oldsmobile runabouts some 425 were produced in 1901, and in 1903, the year Henry Ford finally got started, the Olds Company turned out 4,000 cars. In spite of having lost \$80,000 during the company's first year, it had suddenly become prosperous.

If one had been Henry Ford's landlord back in 1896, one would not have been amused at his tenant's predicament. Henry had just constructed his first crude car. He had put it together in a little shop adjoining his home only to find that it was too large to move out through the doorway. It was necessary to tear a gaping hole in the brick wall of the shop to permit the birth, like a chick emerging from its shell, of Ford car number one,

The contraption itself was crude but practical. The two cylinders of the engine had been fashioned from an old exhaust pipe. The four wheels had been salvaged from bicycles. The only seat was a bicycle saddle. It was belt-driven, with no reverse and no brakes. Miracle of miracles, when the engine was cranked it worked. This rickety contrivance of almost hairpin construction moved off haltingly in the rain over the rough cobblestones and down the alley with the proud young mechanic seated precariously at the controls. Mrs. Ford, umbrella over head, watched from the back stoop. Were she a true daughter of Eve she would undoubtedly have thought, "If only Henry would do something practical!"

The first Ford manufacturing enterprise was a failure. In 1899 several businessmen of Detroit agreed to put up \$10,000 to enable Henry to build ten vehicles. Unfortunately the young inventor had not as yet worked out a satisfactory "mixer" or carburetor. He would not proceed to sell cars until he had. More capital was advanced until something like \$86,000 had been spent. Then capital and genius decided to part company. Henry M. Leland who had been building the motors took over and subsequently formed the Cadillac Automobile Company.

To Ford this was a keen disappointment. He now faced a twofold problem. He must improve his product and find new sources of capital. At this point another facet of Ford's genius became apparent. He was a good showman. In those raw-boned early days of the industry it was speed and racing which fired the public interest in automobiles. Ford figured that if he could build a successful racing car, he would at the same time advertise his proposed horseless carriage and smooth the way to secure capital. Tinkering and improvising, he assembled a machine. In October, 1901, at the Grosse Pointe track, Ford, driving his uncouth-looking racer, came from behind to win from the famous Alexander Winton in his smart, sleek-lined speed car. Ford had done ten miles in 13 minutes and 23½ seconds, thus becoming track champion of the country.

Financial support followed and in November of 1901 there was formed the second Ford enterprise, the Henry Ford Automobile Company, with some \$38,000 of cash as capital. This melted like the proverbial snowball in the nether regions as Ford and his associates disputed the question of whether to manufacture a low- or high-priced car. At that time the high-priced vehicles gave promise of early business success. Ford, however, had seen a vision and would not compromise. It was decided to dissolve.

Back went Ford to his little shop to apply his formula of keeping in the public eye and promoting interest through racing. Then was built one of the most renowned speedcars—the great "999." It looked like a Leviathan

and was a brute in every sense. Powered with four cylinders, seven inches in diameter, with a seven-inch thrust, it turned up an alleged 80 H.P. Its exhaust could be heard almost in the next county. To drive it Ford secured a former bicycle racer who on October 23, 1902 undertook to beat Winton in his great racer, "Bullet." The Ford entry won the lead at the start and never lost it. Auto racing history was made that day. The driver of "999" was Barney Oldfield, later to attain fame as one of the most daring and colorful racers on American tracks. Both the Ford car and its pilot received wide acclaim.

This new car-driver combination must have brought luck. Not only did it win races but five months later Ford's ship finally caught the tide. On June 16, 1903, there was incorporated a small enterprise later to attain the stature of an Atlas—the Ford Motor Company of Michigan. Much credit for launching Ford in this, his third attempt, must be given to the man who took the main burden of financing. This was Alexander Malcomson, a Detroit coal dealer whom Ford had come to know when the latter was an engineer of the Detroit Edison Company.

Raising the initial capital was not easy. It was necessary to take subscriptions in small amounts and accept payment in notes as well as in cash. The Dodge brothers, who undertook to produce chassis for the new Ford Company, subscribed for \$10,000 of stock, giving notes which they hoped to meet out of their manufacturing profits. It was Malcomson, however, who assumed the principal obligation. He agreed to stand good for bills up to \$7000. In order to induce John S. Gray to invest \$10,500 in cash, Malcomson guaranteed Gray against loss and made him president of the new company. Having thus scraped the bottom of the cracker barrel, they secured a bare \$28,000 in cash.

Small as this was, they proceeded to press ahead. Stock in the amount of \$100,000 was issued for the cash, machinery, material, and patents. Ford and Malcomson each received a 25½ per cent interest. Ford became vice president and chief engineer at a salary of \$300 per month. As watchdog for the Malcomson interest, James C. Couzens was made secretary.

In a factory which they rented for \$75 a month, mechanics began turning out crude little cars. Model A was in production with Ford in charge. Couzens took responsibility for handling finances and securing dealers. There was no fancy organization chart showing sharply defined responsibilities. Everybody pitched in. Both Ford and Couzens literally took off their coats to help load freight cars with the first shipment of the automobile modestly advertised as the "Boss of the Road."

This third effort of Ford's was successful. The new car was well received. It was 72 inches long, weighed 1250 pounds, and was powered with a

two-cylinder motor, which gave a speed of thirty miles per hour. It sold for \$950 f.o.b. Detroit. In the company's first delivery season, from June through September 1903, it did a business of \$132,000 and made a profit of \$36,000. Ford was finally launched on the career of his heart's desire.

The manufacturing methods and business practices of the Ford Company were typical of the industry. In those early years the average manufacturer was essentially an assembler of parts. Chassis, motors, wheels, bodies, and upholstery were purchased from older concerns with plants established for supplying other industries. In the main the parts were bought on credit of from thirty to ninety days. Selling of cars was accomplished through independent dealers in various parts of the country who were expected to pay part cash with their orders and the balance when the cars were received.

By these means the small businessman with limited capital worked out a way of financing his automobile manufacturing operations. Basically it was a formula which down through the ages has enabled men to start in business with little money—buy on credit and sell for cash. The "priceless ingredient" is credit. Roy D. Chapin who, with some associates, founded the Hudson Company, spoke of the practice in the following terms:

It is said that the Ford Motor Co. started with \$28,000. We started with much less than that. . . .

Dealers' deposits often paid half the sum necessary to bring out a full year's production; and if the assembling were efficiently directed, drafts against the finished cars could be cashed as rapidly as the bills from parts makers came in. . . .

We sold directly to distributors from the first. We looked for individuals of substantial capital and financial responsibility who would be sure to fulfill their engagements.²

When all was said and done it was the parts makers and selling agents who provided the bulk of the capital for innumerable little concerns embarked on the great adventure of the horseless carriage. Accordingly even as early as 1904 we find 121 small enterprises producing some 22,000 vehicles, including such well-known makes as Oldsmobile, Locomobile, Winton, Haynes, Mobile, and White.

In addition to the usual business problems inherent in opening a new industry, these early manufacturers were confronted with an engineering problem of no mean perplexity. Would it be the steam engine or the internal combustion motor which would prove to be the most efficient form of light, mobile power? Steam cars in the early days had certain

advantages. They were less noisy, smoother in acceleration, better hill climbers, and were fired by a cheap fuel—kerosene. Some manufacturers staked their all on steam power. However, as our engineers came to understand the gasoline motor, its improvement yielded an efficiency undreamed of at first. When we began to build light, powerful, four-cylinder gasoline motors, the days of the steam car were numbered. Slowly over the years the great names in steam, Mobile, Stanley, and White, began to fade from the picture.

When Ford finally got into production in 1903, he was regarded as something of an upstart. Haynes, Olds, Winton, Stanley, White, Locomobile, Packard, and Cadillac had already won recognition. Foreign makes such as the Panhard, Benz, Daimler, and De Dion enjoyed even higher prestige. Moreover it shortly became apparent that the upstart was also a lone wolf. He trailed in nobody's herd. He was the leading nonconformist in an industry of nonconformists. This almost eccentric individualism continued to characterize his achievements.

Ford's first breach of what might be called the etiquette of the industry came in 1903 just as his third company was getting precariously under way. He refused point blank to join the Association of Licensed Automobile Manufacturers. This comprised the leading manufacturers of gasoline cars, all of whom were paying royalties to the owners of the Selden patent for the privilege of producing vehicles powered with internal combustion motors. The situation had been maturing for some years.

Back in 1879 George Baldwin Selden, an attorney of Rochester, N. Y., had filed an application making broad claims for a patent on a self-propelled vehicle to be driven by an internal combustion hydrocarbon motor. This application was kept alive one way or another until 1895 when Selden was granted a patent. Unable to secure financial assistance for manufacturing a car in accordance with his claims, he finally sold the patent to the Electric Vehicle Company of Hartford, Connecticut, a concern controlled by the New York traction magnate, William C. Whitney.

By 1903 the Selden patent had been sustained in a court test and most manufacturers of gasoline cars, bowing to the seemingly inevitable, were paying royalties. Their Association of Licensed Automobile Manufacturers undertook to make certain that no rugged individualist escaped his share of the burden. Fred L. Smith, its president, whom we remember as the principal backer of pioneer Olds, took it upon himself to tell Ford and Couzens that unless they joined and paid the royalties, the going for the new company would be something less than smooth. In fact, it was intimated, they would be put out of business. To this alternative Ford and

**When FORD Speaks the World Listens—
For In All the World No Car Like This**

FORD Model T Touring Car \$780

4 Cylinder—20 H. P.—3 Passengers—With Extension Top, Automatic Brass Windshield, Speedometer, Two 6-inch Lamps and Generator.

**\$700 For This Same FORD Car
Without the Above Equipment**

FORD Model T Roadster \$680

4 Cylinders—20 H. P.—3 Passengers—With Extension Top, Automatic Brass Windshield, Two 6-inch Gas Lamps, Generator and Speedometer.

**\$600 For This Same FORD Car
Without the Above Equipment**

The reason why is told in a few words: We are in a position to do business on a small profit. We have sold 30,358 of this same MODEL T Car—and we will build 30,000 more in 1911—Therefore, Don't Experiment, Buy a FORD

**FORD MOTOR COMPANY
DETROIT, MICH.**

Ford Factories, Assembling Plants and Branch Houses

Main Office and Old Factory—Detroit, Michigan and Dearborn Mich.
New Factory—Highland Park, Michigan and Manchester Ave., Dearborn Factory—Wolverine, Ont., Sandwich 4th East

Western Assembling Plant—Kansas City, 11th and Winchester Aves.

Eastern Assembling Plant—Long Island City, N. Y., corner Jackson Avenue and Honeynut Street.

BRANCH HOUSES:

Atlanta	Cincinnati	Pargo	Montreal	Pittsburg
Boston	Cleveland	Houston	New York	St. Louis
Buffalo	Dallas	Indianapolis	Omaha	Seattle
Cambridge	Denver	Kansas City	Paris	Toronto
Chicago	Detroit	London	Philadelphia	Winnipeg
		Melbourne		

Early advertisement of Model T Ford
Courtesy of the Ford Motor Company

Couzens were of one mind and Couzens is reported to have stormed: "Selden can take his patent and go to Hell with it."

Accordingly suit was brought against the Ford Company and the Associates went a-gunning for the lone wolf with a series of newspaper advertisements warning people not to buy Ford cars. Ford retaliated by offering to indemnify both dealers and purchasers. Issue was joined in the courts. People continued to buy Fords in growing numbers without regard to this battle. In 1905 dividends of \$100,000 were paid by the little

company which just two years before had been started with only \$28,000. After eight years of costly litigation Ford finally won in the United States Circuit Court of Appeals. Thenceforth not only he but all American manufacturers were free to make a gasoline car without paying license fees.

In 1906 Ford borrowed money to buy out Malcomson's 25.5 per cent interest for \$175,000 and several other stockholders as well. This gave Ford 58.5 per cent of the outstanding stock and a margin of control sufficient to enable him to pursue the course to which his vision was driving him—lower prices, more sales, and greater profit. In the following year, 1907, which was one of serious financial disturbance throughout the country, Ford reduced prices and secured upwards of \$5 million in sales. For the first time he made a net profit of over \$1 million. Following this Ford really took the hobbles off of his imagination. "Still playing a lone hand, Mr. Ford next proposed to build the sort of dream car he had in mind, a light four-cylinder touring car of not less than 20 horsepower, capable of transporting five passengers." ⁴ In order to secure both strength and lightness, he introduced the use of vanadium steel. Cylinders were cast en bloc and the number of parts reduced. The steering wheel was on the left side. In offering this car for the first time in 1908 Ford proclaimed that it would do 22 to 25 miles per gallon of gasoline and that its tires would last 10,000 miles. All of this for \$950. Experts in the employ of other companies proved conclusively that this was the stuff of which dreams were made. The older manufacturers and engineers of the industry had themselves a good laugh. It was the last one they were to enjoy for quite a spell. One of the greatest motor cars of all time had been produced. The lone wolf had brought forth the Model T.

Thus after five years of manufacturing, Ford was at last traveling on the broad highway which all his instincts told him led to success. He would improve design, simplify manufacturing, produce in quantity, and sell at lower prices. Then he would repeat, as each reduction in price brought into being a broader base of prospective customers. One of his most striking achievements in production procedure was the adoption of the moving assembly line in 1913. Under the stationary assembly practice previously used the best time for completing a Ford chassis had been 12 hours and 28 minutes. With the moving lines the time was cut to 1 hour and 33 minutes. Aided by this and other economies made possible by huge production schedules, Ford confounded the skeptics and realized his dream—a car for the millions. The record of Ford's success with his brain child, Model T, stands as a monument to the American way. Perhaps more graphically than anything else it has signalized to the world the key to our

material well being and political stability—more goods for more people. Note how as the price was reduced, business went up.⁵

<i>New price for Model T touring car</i>	<i>Year</i>	<i>For fiscal years ending September 30</i>	
		<i>output (Cars)</i>	<i>receipts</i>
\$950	1909	10,660	\$9,041,291
780	1910	19,051	16,711,299
690	1911	34,979	24,656,768
600	1912	76,150	42,477,677
550	1913	181,951	89,108,885
490	1914	264,972	119,489,317
440	1915	283,161 (a)	121,200,871
360	1916	534,108 (a)	206,867,327

(a) Period ending July 31st; ten months only 1915.

Many businessmen of more orthodox thinking would have been content to rest on the record and permit gathered momentum to carry them along. Ford was not. He began making more ambitious plans. He and his associates laid out the expansive River Rouge project which would include blast furnaces, foundries, glass factories, and facilities for making parts. It was a gargantuan conception of seeming folly to those without the vision.

Among the dissenters affected by this acute myopia were the Dodge brothers. As minority stockholders they brought suit to enjoin such an ambitious reinvestment of earnings and to compel payment of higher cash dividends. The suit dragged on until 1919 and Ford continued to build. The final decision directed him to pay a special cash dividend but supported his use of surplus funds greatly to expand facilities. This action in regard to dividends was too much for the lone wolf. He decided to buy out minority stockholders, first allowing them to get the disturbing impression that he might as an alternative start an entirely new concern to build low-priced cars. From large eastern banks Ford secured a one year credit of \$75 million of which he used \$60 million. By the fall of 1919 Ford and his family owned all of the stock of the then world's largest motor company. The Dodge brothers were paid \$25 million in cash for stock for which they had originally subscribed \$10,000 and on which they had already received \$9,871,500 in cash dividends.

In spite of the extraordinary prosperity of the Ford Company, it is interesting to note that its financial position was not impregnable. The depression of 1920-1921 found it, along with most others in the industry, in

an extended condition. Emergency measures were found necessary. When trouble started in the summer of 1920, Ford's first step was to reduce prices in order to stimulate falling sales. This proved of only temporary benefit and business continued to get worse. At the year's end it was obvious that something drastic would have to be done. The company owed about \$143 million and its cash was down to \$13½ million. Ford took prompt action. Buying of parts and materials was abruptly shut off. Parts on hand were hurriedly assembled into finished cars, which were shipped draft attached to dealers who were forced to accept and pay for them. Ford production was then shut down. Rumors began to spread. Joyfully in some quarters, word went around that finally the lone wolf had his foot in a trap. It was whispered that Ford was broke.

Such was far from the case. By his prompt but autocratic action Ford had escaped with some margin to spare. He had avoided recourse to bank loans. The reason for his success lay in the good will of Ford dealers and the importance they attached to retaining their franchises. The capacity to make them take and pay for 125,000 cars in a period of business panic was something available only to Ford. In effect, he had forced his dealers to do his emergency financing. Many of them borrowed heavily from local banks.

Beyond this, however, the Ford genius showed itself. Operating economies and improved methods were introduced to the extent that overhead per car was reduced from \$146 to \$93. By purchase of the Detroit, Toledo & Ironton Railroad a way was found, through speeding up freight deliveries, of cutting the cycle of production from 22 to 14 days. This reduced the capital tied up in inventories and in the process of manufacture by about \$28 million. Ford had weathered the storm and had profited by the experience.

The optimism which he had shown in projecting the huge River Rouge development in 1914 was borne out. As compared to 264,000 cars produced in that year, the company in 1923 made over 2 million and showed a net profit of nearly \$100 million. Integration of production facilities was extended and expanded. Assembly plants were started in strategic centers in the United States and abroad. Then in the years 1923 to 1926 the lone wolf faced a situation which was novel for him. Ford sales lost ground compared to other low-priced cars such as Chevrolet, Dodge, and Essex. The great Model T born in 1909 had become dated. Competition had produced cars more appealing to the public. Accordingly a new Ford was designed and in 1927 put in production.

Even though Ford had been slow to make this adjustment, his company had grown to new proportions and was no less highly regarded. At the

end of 1926 net assets were over \$700 million. Ford next experienced a sensation perhaps unique to him among all businessmen. He refused an offer of a billion dollars for his company. About that time John W. Prentiss of Hornblower & Weeks offered such an amount for all of the Ford stock, with the idea of reselling it publicly through a large syndicate of security dealers.

It is to be noted that the growth from the beginning in 1903 with only \$28,000 in cash to the billion-dollar value stage had all been accomplished through the reinvestment of company profits. Rapid as the expansion had been no new outside capital had ever been required. The record constitutes a forceful example of the power inherent in the plowing back of earnings. Of course, basic to all this success was the Ford genius. His mind was sensitively attuned to the potentialities of the motor car and the modern era of quantity production. He was the unquestioned leader of the industry in its period of most rapid growth. To give the world the benefit of his unique talents, it was necessary that he work as an individualist. He was Henry Ford, first, last, and all of the time. By breaking from the herd and insistently going his own way, Ford advanced the cause of cheap transportation the world over. It was a great contribution.

THE MOTOR INDUSTRY—NEW GIANT

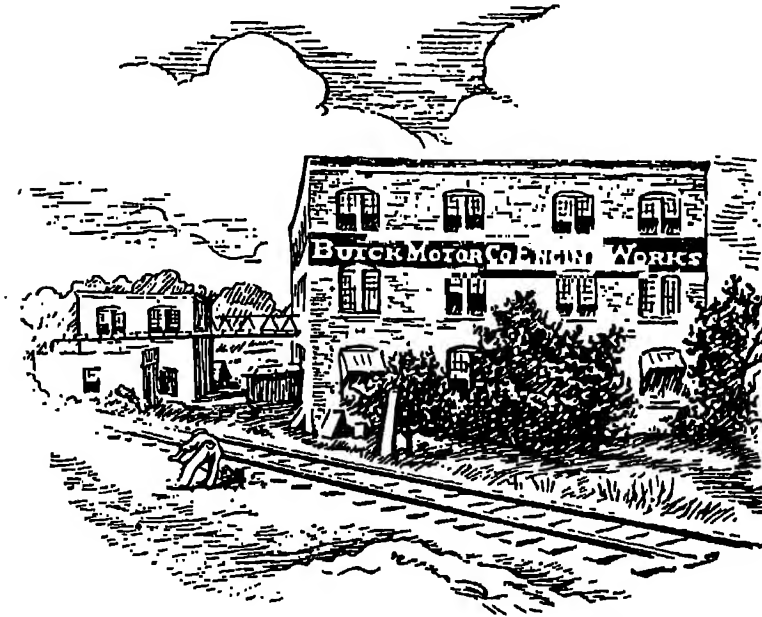
THE hectic upsurge of this new industry produced a multitude of colorful personalities as unknown mechanics and small-town businessmen forged ahead to leadership. Ford's story is typical in many ways. But equally stirring tales of business achievement could be told of companies such as Chrysler, Packard, Dodge, Nash, Hudson, Studebaker, White, Mack, and many others. Most spectacular of all, however, is the story of General Motors. From it emerge two outstanding individuals—William Crapo Durant, dramatic pioneer, and Alfred P. Sloan, Jr., creative organizer.

This man Durant, preeminently a product of his times, was one of our greatest salesmen-promoters. He made his start during the 1880's in Flint, Michigan. Having acquired for \$50 a patent on an innovation in the construction of a horse-drawn cart, he entered into partnership with Josiah Dallas Dort and contracted with a manufacturer for 10,000 carts at a cost of \$8 each. Such a production schedule was almost unheard of. But Durant had no difficulty in selling the output for \$12.50 each. He had discovered the magic which could be wrought with quantity production and wide distribution. Durant and Dort invested their profits in financing the Durant-Dort Carriage Company. By the early 1900's the new firm was producing some 50,000 carts per year, was highly prosperous, and had created a sensation in the carriage industry. Durant was already looked upon in Flint as something of a genius.

It was quite natural, therefore, that Durant's aid should be solicited when in 1904 David Buick's struggling little automobile company, operated by the Flint Wagon Works, became financially involved. After some hesitation Durant agreed to reorganize and assume the management of the Buick Motor Company. This was just one year after Ford had made his successful start. It was also the last time that his competitors or associates were able to detect any hesitation on Durant's part.

The methods employed in rebuilding the Buick Company were typical of the practices of the industry. Existing creditors were prevailed upon to supply more parts on credit to the new management. Additional bank

credit was arranged. Car design was improved. To this formula was added the dynamic quality of Durant's personality. With his seasoned experience in selling on a national scale and broad acquaintance throughout the country, Durant shortly had perfected an alert and aggressive dealer organization. The four-cylinder Buick, selling in the \$1000 price range, was a good value. Responding to Durant's enthusiasm, Buicks began to move. In 1905 some 673 were sold and in 1906 sales jumped to 2295 cars. By 1908 the Buick Motor Company led the industry with a production of



Original Buick factory at Flint, Michigan, 1903-04

The Turning Wheel, by Arthur Pound, Doubleday, Doran & Company, Ltd.

8487 cars compared to Ford's 6181. In a short four years, largely through reinvested earnings, the net worth of the company had been increased to nearly \$3,500,000. Durant had become a Miracle Man.

It must not be thought, however, that this crown was worn with complacency. Like other car manufacturers Durant noted the unpredictable, changing quality of the industry. The product was so new and its engineering so untried that from one season to the next no manufacturer could foretell which cars would be popular or, on the other hand, which leaders might pass into oblivion. Ford's solution, as we have seen, was to concentrate on a standard model, gradually reducing its price so as to

broaden his sales target. Durant took an entirely different slant. He would diversify his products, offering cars of various types and at different prices with the hope that each year some of them would win popular approval. Ford was shooting with a rifle; Durant with a shotgun. Both succeeded.

As a means of carrying out his conception of manufacturing diversification, Durant caused the incorporation of the General Motors Company in the fall of 1908. Its shares were exchanged for those of the Buick Motor Company. An underwriting agreement was arranged for the sale of \$2 million General Motors preferred stock carrying a 50 per cent common stock bonus. During the next two years Durant, using both cash and General Motors stock, bought up other companies in a campaign which had the industry agog. He acquired eleven different car companies including Cadillac, Olds, and Oakland, and a miscellaneous group making parts and accessories. This was done in the grand manner which was to characterize Durant's operations. He made commitments on the spur of the moment and at times paid utterly fantastic prices. Large blocks of stock were issued for "services" and to reward favorites. There was a high proportion of water in his company's capital. Nevertheless the surging growth of the industry and Durant's policy of retaining earnings in the business were constantly turning water into real values.

On the surface Durant's ambitious new General Motors looked at this time like another business miracle to his credit. In 1910, two years after starting, its sales were almost \$50 million and net profits about \$10 million. In reality, however, Durant had spread himself too thin. He had stretched his credit to the limit and had reached that danger point where one untoward event could bring catastrophe. Such misfortune came in the form of a slump in Buick sales, the company which was the keystone of his credit arch. A meeting of bank and merchandise creditors was called. Emergency action was decided upon. Added working capital was needed which could only be secured upon a complete change in the company's expansion policies. Durant, the driving, daring, and undoubtedly reckless pilot, was dropped. His ship was handed over to banker control.

In order to fund part of its current debt and provide new working capital, an issue of \$15 million General Motors five year 6 per cent notes with a liberal bonus of common stock was sold at a price around 85 to a syndicate headed by Lee, Higginson & Co., J. & W. Seligman & Co., and the Central Trust Company of New York City. The event was significant because it marked the entrance of eastern capital on a substantial scale into the automobile field. The industry's capital requirements had become so large that they could no longer be met by parts makers and suppliers.

Control of the company was vested in these banking interests through a

five-year voting trust. Immediately a business reorganization was undertaken. The adventurous buying of new companies was stopped and some of the old ones were sold. Conservative financial policies were adopted. Operating controls and standardized methods were installed.

Aided considerably by the growing demand for cars, success attended these efforts. In the year which saw the termination of the voting trust, 1915, the company was in strong condition with ample working capital and no bank debt. Furthermore, for the first time the common stock was put on a dividend basis with a liberal disbursement of \$50 per share.

The expiration of the voting trust gave Durant an opportunity to stage a sensational comeback. He was not the type to take defeat lying down. In a daring maneuver he recaptured control of General Motors. To put himself in position for this triumph had taken some time. After he had been ousted by the bankers from the management of General Motors (1910-1911), Durant had hied himself back to Flint to begin again from scratch in building up new motor companies. Employing only a modicum of capital, he drove ahead with the customary Durant vigor. One of the models he introduced had been designed by a former racing driver for the Buick Company—Louis Chevrolet. Once again fortune smiled upon Durant. The new Chevrolet car at first gave promise, and then became a sensation. By the end of 1915 its annual net profits were in the neighborhood of \$2 million. In the fall of that year, for the purpose of consolidating his new interests, Durant organized the Chevrolet Motor Company of Delaware. Its common stock was offered for public subscription.

Meanwhile Durant had been occupied with moves in the field of grand strategy. He had succeeded in enlisting the financial assistance of Louis G. Kaufman of the Chatham & Phoenix National Bank, New York City. Of even more significance was the fact that he had laid his spell over the owners of one of the nation's greatest aggregations of wealth—the du Ponts of Wilmington, Delaware. Throughout the year 1915 Durant and his supporters were quietly buying up General Motors stock in the market.

Then in the late weeks of that year Durant launched his offensive. Clothing the little Chevrolet Company with all the magic of his own name, he offered to exchange five shares of Chevrolet stock for one of General Motors. It was in effect a David and Goliath encounter. Chevrolet was earning about \$2 million and General Motors around \$14 million. In spite of the active opposition of the banking interests which had been running General Motors, many of its stockholders accepted the exchange. Nothing succeeds like success and Durant looked more than ever like a winner. By June of 1916 the battle was over. Chevrolet owned a majority of the stock of the General Motors Company. The little company had swallowed

the big one, many times its size. Durant had performed once more. Again his flag was at the masthead as President of General Motors.

It would be pleasant to relate that Durant and General Motors lived happily ever after. Such was not the case. Durant continued to be himself—the man of action, the perennial optimist and promoter extraordinary. Likewise he continued to suffer from the defects of his qualities. A wealth of imagination and spirit of adventure left no room for prudence in his make-up. His was the type that could never in prosperous years make allowance for future adversity.

After again taking command in 1916, Durant drove expansively ahead. In that year he organized the entity which has since carried on the affairs of this business empire, the General Motors Corporation (Delaware). This new concern took over both the General Motors Company (New Jersey) and the Chevrolet Company. It became largely an operating as distinguished from a holding company.

In the meantime Durant had also formed the United Motors Corporation, a holding company which had purchased some valuable parts companies such as the Dayton Engineering Laboratories Company and the Hyatt Roller Bearing Company. This group was turned in to General Motors late in 1918. Its earnings at that time were about \$7 million a year. In these acquisitions, as in those prior to 1910, Durant at times paid extravagant prices and also permitted large blocks of stock to be issued for promotional services. Durant's expansion plans had become so large as to call for outside capital. Accordingly in mid-1920, J. P. Morgan & Co. and some English interests agreed to underwrite an offering of 3,287,803 shares of General Motors common stock at \$20 per share. This brought approximately \$60 million of new money into the corporation.

The receipt of this large amount of new capital at that particular moment was fortunate. Trouble was abrewing. During the first six months of 1920 business surged upward. Consumers were scrambling for goods. Manufacturers were bidding for materials and building up large inventories. Prices were rising. It was the seller's dream of a perfect market. General Motors, like most other business concerns, joined the merry chase. Its inventories went from about \$128 million at the beginning of the year to over \$200 million by the end of August. In addition, some \$79 million went that year into plant expansion. Then overnight the dream began to fade. Prices broke badly, orders were cancelled, and buyers could name their terms. General Motors like many others was out on the end of a limb. As sales fell sharply, inventory values were drastically cut. Before the

trouble was over General Motors was forced to take losses of over \$100 million. The stockmarket registered for all to read the serious illness of business. General Motors sold down from 27% per share in May to 13% in December.

It was Durant's quixotic personality reacting to these events which wrought the disastrous climax to his eventful career. He attempted what has ruined many men—to support the price of a particular stock or commodity against a broad general market decline. Even in this folly, one's sympathy is enlisted by Durant's qualities. He was not impelled by the desire for personal profit. Rather his attitude was Napoleonic. He was the great business emperor and General Motors was his empire. By maintaining its credit and prestige he could go on to other conquests. His actions were directed in part by an identity complex. General Motors was Durant. In consequence he was carried away by the idea that it was his personal responsibility to see that his army of friends came to no loss through owning General Motors stock.

As the market fell Durant bought. But prices worked lower and almost constantly more stock was offered. All through the summer and early fall of 1920 Durant stood there always buying, buying, buying. He pledged his own large holdings of General Motors for money with which to increase his purchases. He prevailed upon friends to join him, at the same time guaranteeing them against loss. A dozen telephones from his desk were kept busy instructing brokers all over the country. His office and its ante-room were daily the scene of a milling group of brokers seeking more orders—and toward the end more collateral. Nevertheless the outpouring of stock continued. One transaction alone involved 150,000 shares. As the forces of general business liquidation bore down upon him, Durant never faltered. He was true to that inner vision that set him apart from other men—that made him Durant. He gave his all in this grandiose battle with the inexorable.

Then finally one day in the fall, General Motors stock in its persistent decline broke below \$15 per share. The business Napoleon had fired his last shot. Durant was through. His credit was exhausted. His personal loans aggregated upwards of \$25 million. Banks and brokers all over the country were clamoring for payment. Dominated by fear of further decline in the price they threatened to dump willy-nilly upon the market Durant's General Motors stock which they held as collateral. With something over 2 million shares involved, such a course at a time when businessmen were already in a state of jittery nerves would have invited stockmarket catastrophe. As long as Durant's huge holdings were scattered among many brokers, anything might happen. The obvious

solution was to consolidate the holdings in one spot where these dangers would be removed—to put the stock into strong hands. No time was to be lost. One more untoward event in the market would have precipitated a stampede of selling.

Fortunately Durant had already associated himself with two of the country's strongest financial groups, the du Ponts and the House of Morgan. He had, however, failed to make known to them the extent of his market operations. When at the end he disclosed the facts, both of these interests saw that something must be done and fast. Accordingly a meeting was hurriedly called late one evening in Durant's office in uptown New York. In a restrained and coldly dignified manner Durant told in detail of his huge loans and his inability to meet them. The daring genius that had conceived and put together one of America's greatest manufacturing enterprises was forced to make the humiliating admission that he had got himself into a frightful mess. The Conqueror who had built a business empire was now petitioning for rescue.

The meeting carried on hour after hour until about dawn. Finally a plan was worked out. The du Ponts agreed to purchase 2,504,273* shares of General Motors from Durant for \$23,790,600 in cash plus a block of stock in Du Pont Securities Company which was to be formed to carry out the transactions. With this cash Durant was to pay off his loans and deliver his General Motors stock free and clear. To conclude the deal the du Ponts put up \$7 million in cash and borrowed \$20 million from J. P. Morgan & Co. secured by their own holdings of General Motors and the shares acquired from Durant, or a total of about 4 million shares. Later Durant turned over his interest in Du Pont Securities for 230,000 shares of General Motors.

Then on November 30, 1920, came the announcement that Durant had resigned as President of General Motors. He was never to return. This was indeed a bitter defeat for the great promoter and builder of a business domain. But the man was still Durant of the unconquerable spirit. When some time later a friend was calling on him in his new small office, he made it quite clear that he wanted no sympathy. As goodbyes were being said, he strode to the window, drew himself erect, and directing his gaze at New York's inspiring skyline exclaimed, "It's a new day!"¹

In the reorganized General Motors setup, Pierre S. du Pont became president and Alfred P. Sloan Jr., vice president in charge of operations. They brought to bear on the affairs of the company those qualities which Durant so sadly lacked. Businesslike operation and organized methods succeeded the former plunging and haphazard practices. As a matter of

fact, the whole industry was undergoing a change. The lusty, booming, mining-camp days were giving way to a new order.

When du Pont and Sloan took over, they faced some perplexing problems. The company had spread itself too expansively. Concentration of effort was definitely indicated. It was necessary to lop off some branches of the tree so that others might thrive. Outside consulting engineers had recommended discontinuance of Chevrolet. Being directly competitive with Ford, they predicted for Chevrolet a dubious future. Sloan and du Pont thought otherwise. They disregarded the advice of experts and backed Chevrolet heavily. Within a few years this courage and judgment were rewarded. Under the competent direction of William S. Knudsen, Chevrolet was not only able to compete successfully with Ford but in 1927 wrested leadership away from him to become the world's number one car in units sold.

In this rearranging of the affairs of General Motors, it shortly became apparent that Sloan was signally qualified to direct the company through this second phase of its development. Accordingly du Pont stepped aside and Sloan took the bridge as president. His previous experience in managing a successful business of his own was now to prove invaluable. Factual studies and scientific methods were applied all along the line. Patiently and carefully Sloan welded the sprawling aggregation of Durant companies into an integrated and coordinated organization.

That Sloan was a skipper of unusual competence in directing the course of this leviathan of business is attested by the record. In some peacetime years company sales have exceeded 2 million motor vehicles and accounted for more than 40 per cent of American motor car production. By 1948 working capital had grown to over \$1 billion. This was quite a growth for Durant's little acorn, the Buick Motor Company, which forty years before was practically insolvent with annual sales of only 673 cars. Credit for the achievement belongs to a veritable army of men headed by Durant, the promoter; du Pont, the capitalist; Morgan, the banker; and Sloan the chief executive.

This record of General Motors is typical of the industry. During these same years other pioneers of the "horseless carriage" era were driving ahead in a competitive race to build better cars and more of them. Men like Nash, Chrysler, Chapin, Coffin, MacCauley, and a host of others, working under our system of free enterprise, by their initiative and aggressive energy were spreading American abundance to the four corners of the globe. As early as 1926 we accounted for upwards of 85 per cent of world output. While for each of our large companies there is thus a

success story to tell, we must for present purposes rest content with those of the two largest in the industry.

In concluding this necessarily restricted survey of the coming in of the automobile business we are once again struck by a noteworthy feature. Its extraordinary growth was financed largely from reinvested earnings. Based upon the figures of eight of our most important manufacturers, it has been estimated that in 1926 approximately 80 per cent of their total tangible invested capital of about \$1.6 billion was derived from plowed-back profits. The reinvestment of these earnings permitted vast plant expansion and integration of producing elements. These in turn worked toward lower prices, or better values, or broader markets. More cars for more people. That such earnings were realized in the first instance and retained in the business secondarily was due not only to the liberal profit margin which characterized the operation of the industry but also to the fact that corporation taxes took but a small portion of the earnings.

THE GLAMOR BUSINESS

*Part One: From Peep-Show Arcade to
Feature Films*

THE motion picture business, confounding one of our cherished superstitions, started on Friday, the 13th of April, 1894, at 1155 Broadway, New York City. This first Kinetoscope Parlor was scheduled to open the following day but the event was accelerated by the desire of the free-enterprisers in charge to earn some supper money. These included Alfred and Bertram Tate who were getting the place ready for Andrew M. Holland, the concessionaire.

They had installed ten Edison "peep show" machines in a vacant shoe store. Once opened, enthusiastic patrons crowded the small arcade until one A. M. The first day's business grossed the munificent sum of \$120. The Tate brothers were thrilled.

This was the modest debut of the most sensational, flamboyant, uncontrolled business adventure since the beginning of trade. With the velocity of a prairie fire during the next three decades motion-picture show places spread over the country until some 20,000 theaters in the United States were carrying daily entertainment to millions of patrons. Before it was fifty years old this industry would represent an investment of over \$2 billion and be doing an annual gross of over \$1 billion a year.

In its early years this unpredictable new business flung wide the doors of opportunity. Starting on a shoestring, or on no string at all, thousands of unknown, impecunious people became proprietors and built small fortunes. Others grew to leadership in the industry and attained great wealth. Men of capital in other fields failed to appraise the potentials of this one or to understand its erratic vagaries.

Strange factors were involved. Inherent in the showing of motion pictures were powerful forces of mob psychology. An audience that numbered

millions came to genuflect before a handful of players. Widespread hero worship produced the incredible system of "stars." Charlie Chaplin's earnings jumped within a few years from a few hundred dollars a month to over \$1 million annually. Mary Pickford, still in her twenties, came almost to dominate an entire industry. In the crescendo of lavish film production money lost all relation to commonly accepted values.

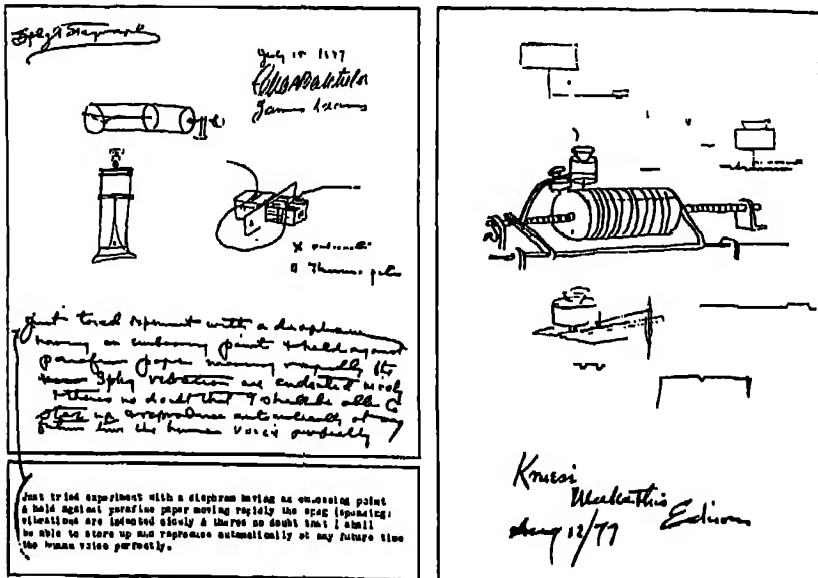
Basically, however, this was a sound business. People have an almost insatiable craving for entertainment and in the aggregate spend huge sums for its satisfaction. A new field of world trade was opened which we were able to exploit with almost unparalleled success. Our shadow pictures thrilled millions of customers in foreign countries, most of whom came to know America only through the portrayals of the screen. The motion-picture film spoke a universal tongue. For the first time man's yearning for amusement could be catered to in a common form the world over. Viewed from the standpoint of dramatic expression, a new art had been born.

The Edison Kinetoscope which so enthralled those first spectators was a crude device. A narrow cabinet, some four or five feet in height, presented a peephole, or viewing slot, in its top surface. On the inside fifty feet of film was arranged so as to revolve by electric motor in a continuous strip around a series of spools. An electric light, a viewing lens, and a shutter were so adjusted that the observer saw lifelike figures moving in animation as the film passed before the eyepiece.

This invention of that prolific mastermind of Menlo Park was a culmination as well as a beginning. For long years men had given thought to the idea of producing in picture form an illusion of natural movement. But it was not until about 1840 that Peter Mark Roget in London (he of the *Thesaurus*) came upon the discovery that is basic to motion-picture production, the so-called principle of "persistence of vision." It was found that a sudden impression upon the retina of the eye lingers for an appreciable moment—roughly one-fiftieth to one-thirtieth of a second. Hence a series of intermittent impressions leaves upon the mind a sense of natural motion. Continuous movement of images, on the other hand, results only in blurred perception. Thus today both movie cameras and projectors operate intermittently.

Following Roget's discovery, inventors both here and abroad set themselves to perfect a device which would trick the eye into the illusion of viewing things in motion. Most notable of these was Thomas Alva Edison. After inventing the phonograph in 1877 it occurred to him that if he could combine it with moving pictures he would have an amusement appliance of great appeal. Basically he was anticipating the "talkie" which

burst with such disturbing effect into the movie industry almost forty years later. Edison tackled the problem of inventing both the motion-picture camera and the viewing device. As to the former, it was not until he came across the work of another genius that he made headway. George Eastman had just evolved the roller photographic film in an effort to stimulate amateur photography and sell more Kodaks. Using this film for his camera, Edison invented a sprocket control, the teeth of which fitted into perforations in the film strip. In this way the film could be moved



Facsimile of drawings and notes by Edison relating to his development of the phonograph

Courtesy of the Thomas Alva Edison Foundation

quickly and stopped for short intervals before the camera lens. Edison thus achieved the intermittent exposure which, in conformity with Roget's discovery, was necessary to produce a satisfactory illusion of motion. He called his camera fitted with this film-feed control sprocket, the Kinetograph. Concurrently he evolved the peep-hole viewing machine or Kinetoscope. "It is provable that there is not now and never has been subsequent to the year 1888 any motion picture film machine whatsoever of any relation to the screen art of today that is not descended by traceable steps from the Kinetoscope."¹

Edison applied for patents in 1891. Having worked out the basic me-

chanical problems, he and his laboratory assistant in this field, William K. L. Dickson, were faced with another difficulty. They would have to provide a continuous supply of new pictures for the Kinetoscope. Then was built the country's first movie studio. Back of the Edison factory, Dickson threw together a little shed built of scantlings, lath, and tar paper. Costing a total of \$637, it was appropriately known as the "Black Maria." In this little hut, which could be moved to face the sun at different hours of the day, were made our first movies of dancers, pugilists, jugglers, and a variety of other performers.

Edison arranged for the sale of the Kinetoscope through outside interests—Raff & Gammon. They bought the machines for \$200 each and resold them to little arcade exhibitors for \$300 to \$350. The crude 50-foot films were similarly sold for a small fee. Public interest was active from the start and shortly thousands of persons were being entertained by the flickering views to be seen through the Kinetoscope peepholes.

Now an extraordinary situation developed. Edison, whose inventions had made the motion picture possible, failed to see the importance of the next step—projection on a screen. In fact he did not seem to sense in any substantial way the almost limitless future for this new form of entertainment. He looked upon the Kinetoscope as just something to go along with the phonograph in little arcade rooms. He even refused to spend \$150 to take out foreign patents.

But certain arcade exhibitors were beginning to chafe at the limitation that only one person at a time could view the picture in the Edison Kinetoscope. Among these were the Latham brothers of New York who had been specializing in pictures of boxing matches in their peep-show parlor. With the help of their father, Woodville Latham, they worked out a jerry-built projection machine and in May, 1895, they put on a four minute screen show at 153 Broadway, New York City. "The opening May 21, 1895, ill-advised and imperfect as it was, was the first public showing of motion pictures on a screen in all the world."²

This pressure for projected pictures was not lost upon Raff & Gammon who had the responsibility for selling the Edison Kinetoscope. They agreed with the arcade operators that more admissions could be sold if patrons were treated as a theatre audience. Edison, however, showed only scant interest. He believed there was a greater commercial future for him in manufacturing peep-show machines. But Raff finally prevailed on Edison to witness the operation of a projection machine which had been worked out by Thomas Armat of Washington, D. C. It was practically conceived although still crude. Edison was impressed. He suc-

cumbed to Raff's persistence and agreed to manufacture a projector on the "Armat design."

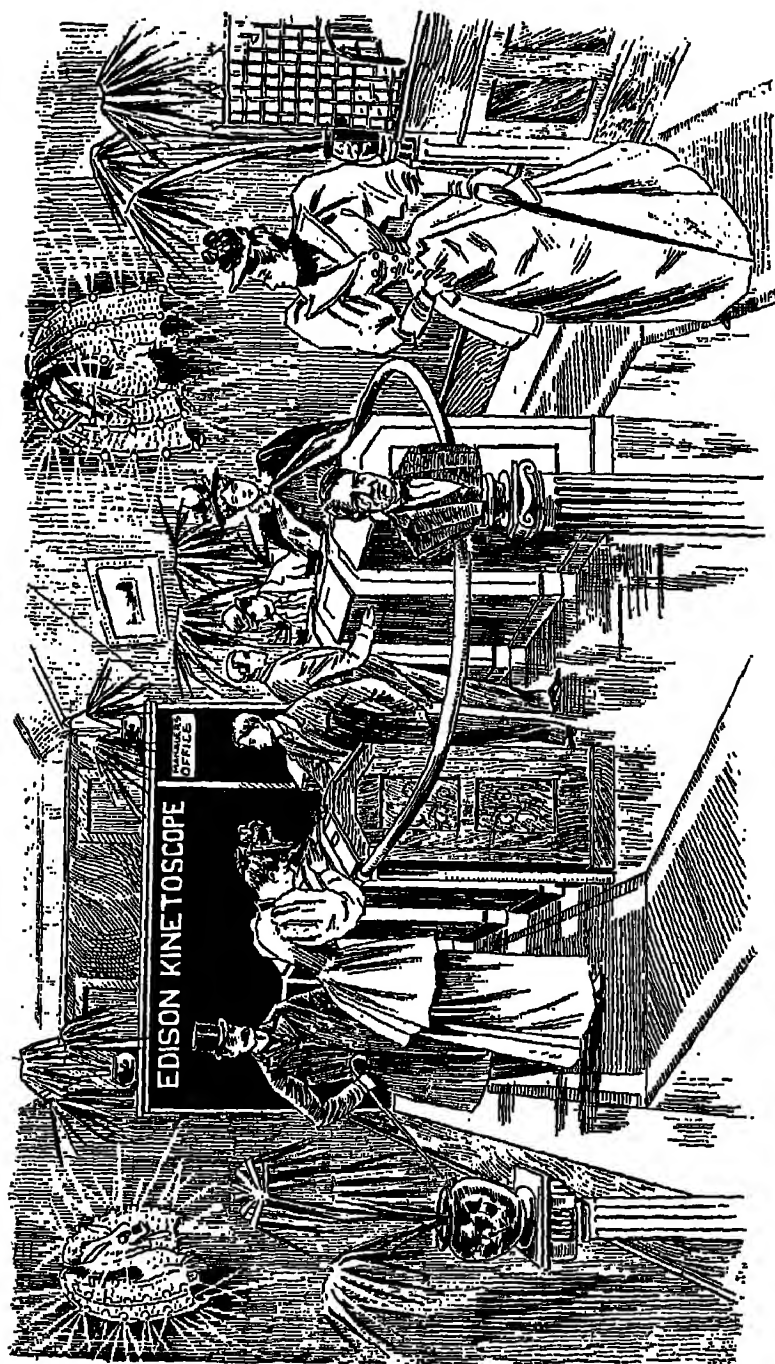
This machine, termed the Vitascope, was successful and received a long-celebrated first showing at Koster & Bial's Music Hall, Herald Square, New York City, on April 23, 1896. Its fame spread quickly and soon Edison's distributors, Raff & Gammon were selling exclusive rights for its use in separate states at prices ranging from \$1500 to \$5000 for each such territory. Films continued to be produced in the "Black Maria" and were sold for prices ranging upward from \$10. Exchanges were made for a \$2 fee.

The movie business had taken on a new pattern. Projection of pictures to large audiences had arrived. The peephole device was on its way out. For the next ten years vaudeville houses were the principal places of exhibition. "Living pictures" were simply one act of a vaudeville show.

As public interest in motion pictures grew, other inventors and small-time promoters came up with cameras and projection machines, most of which infringed the Edison patent. The sale of these illegitimate products, many defective in quality, created a chaotic situation. Adding to this turmoil was another practice which gave the industry a bad name. Some enterprising cutter-of-sharp-corners discovered that one could take a film, make a negative of it, and then reprint any number of positive duplicates which could be sold at cut rates. "Duping," particularly of foreign films, became a common practice.

The first films produced were, as we have seen, episodic in character—dancers, parades, prize fights, and special views. A memorable one was a head-on view of the oncoming Empire State Express. It was so realistic that the locomotive seemed to be plunging straight out into the audience. Gradually the idea took hold of using the motion picture to tell a story. An early such Edison film, 800 feet in length, became a national sensation in 1903. This was *The Great Train Robbery*, a storied sequence of a train holdup, pursuit of robbers, a dancehall episode, and an escape. The Vitagraph Company then presented a film version of *A Gentleman of France* and in 1905 *Raffles the Amateur Cracksman*. Thenceforward the storied film took hold until it dominated the art. Young as the industry was, there were already a good many producers. Among these, Biograph stood first in quality of product.

Changes and important developments were occurring almost as rapidly as these early films flickered. In April, 1902, Thomas L. Talley opened the first out-and-out motion picture theater in Los Angeles. The next year Harry Warner and his brother opened a "ninety-nine seat store show" in Newcastle, Pennsylvania. Improvement in equipment proceeded rapidly.



Interior of the first Edison Kinetoscope Parlor on Broadway near 28th Street, New York
Courtesy of the Thomas Alva Edison Foundation

In distribution new procedures were also evolved. Henry J. Miles in San Francisco started in 1902 buying films as an intermediary and then renting them out to successive exhibitors. Others followed suit and thus the "exchange system" was made part of the industry. ". . . it was the most important development in the motion picture since the invention of the projection machine. From that point onward distribution developed until it became the controlling element of the film institution."³

Overshadowing all, however, was the advent of the "nickelodeon." In this for the first time the projected motion picture achieved separate identity on a broad scale. Harry Davis of Pittsburgh and John P. Harris of McKeesport had become interested in exhibiting motion pictures. In 1905 they took an abandoned store, recessed its front entrance, put in a few chairs and a second-hand motion-picture projector. They offered a continuous showing of short pictures running from eight in the morning until midnight. The price of admission was 5¢ and the new showplace was given the grandiloquent name of "nickelodeon." It was a smashing success and was shortly bringing its two owners a handsome profit each week. Others quickly took up the idea. The country broke out into a rash of these little motion-picture stores with their flamboyant, garish posters advertising sensational programs. In the next few years some eight or ten thousand were exhibiting motion pictures throughout the United States. The world and his wife became regular patrons. The movies were established as an integral part of the American scene.

In these years men subsequently to become leaders of the industry were getting started in the new game. If the automobile industry was pre-eminently a field for the small businessman, the movies opened doors of opportunity for those even smaller. One could start in this field with a few hundred dollars borrowed from friends, or simply with a little nerve and a persuasive line of talk. Perhaps never in the history of American business had there been such widespread opportunity for the impecunious to become proprietors and accumulate capital. Operating a nickelodeon was a cash business with every fellow citizen a prospective customer. Businessmen seasoned in other fields failed to grasp the significance of this new form of entertainment and the atomic power of the nickel. They regarded the whole thing as a passing fancy fit only for the fly-by-night. Meanwhile unknown men of small means were sowing seeds later to yield an abundance. Adolph Zukor, Marcus Loew, Carl Laemmle, William Fox, Sigmund Lubin, William Selig, George K. Spoor, and many others entered this field as producers, exchange men, or exhibitors.

Typical was the record of an early production enterprise, the Kalem Company. It was started in 1907 by George Kleine, an exchange man in

Chicago, together with Samuel Long and Frank Marion, both formerly of Biograph. The company's title was arrived at by combining the initial letters of their respective surnames—K, L, M. The financing of this enterprise was something akin to a man lifting himself by his bootstraps. Marion contributed the only cash, \$800. Long provided the partitions to be used in the building where the studio was to be located. Kleine, as his part, guaranteed the purchase price of an imported camera.

Brashly they essayed a presentation of *Ben Hur* in one reel, put on with settings borrowed from the then famous Pain's fireworks spectacle. The question of possible copyright infringement in using *Ben Hur* did not bother Kalem in the slightest. Producers looked upon the whole field of literature as a garden open to all. Much was their surprise when the owners of the copyright brought suit and collected damages. As a film, *Ben Hur* was moderately successful and Kalem followed with others turned out higgledy-piggledy to meet the insatiable demand of the booming nickelodeon theaters. Within two years of its start, Kalem was yielding a profit of \$5000 per week, or at the annual rate of \$260,000, a pretty good return in view of the fact that the starting capital closely approximated zero.

Easy moneymaking of this kind, in return for a gamble of a few white chips, was bound to attract the less stable adherents of other pursuits. The new field was overrun by an uninhibited, wild and woolly mob that knew only the Law of the Jungle. From production, through distribution to exhibitors, it was a cut-throat business and devil take the hindmost. By and large its ethics were sub-zero. Small workshops were turning out equipment which infringed legitimate patents. Irresponsible shoestring producers were "duping" films, both foreign and domestic, to be sold in bootleg commerce by exchange men who charged anything the traffic would bear. Exhibitors indulged in all forms of chicanery. "Bicycling" of films was one of these. A theater would obtain a film and pay one rental. Then several others would secure its use by simply rushing it to and fro with a swift messenger.

Out of this ebullient chaos came some significant developments. The Edison Company had instituted a series of suits for patent infringement. In October, 1907, it secured a judgment against an important producer, William Selig. This gave other companies food for thought. Some of them possessed patents the validity of which was undetermined. Accordingly George Kleine of Chicago undertook to promote a patent agreement between Edison and other leading producers. All went smoothly except for Biograph which had slipped into a questionable financial condition. In spite of this, Biograph demanded unusually favorable terms with regard

to Edison. They could not afford to be left out and their chances of securing their demands looked slim. However, Biograph's affairs were being directed by Jeremiah J. Kennedy, an engineer trained in the delicate niceties of the construction business. He decided to bluff on a pair of deuces. To an Edison lawyer he shouted over the telephone, "Say, if that agreement does not go through just the way it is, without the change of one word in it, Biograph is going to bust this business wide open. We will put our cameras on the market and license everybody. If we can't get together and control this business we will make a first class wreck of it—and we'll have it now." ⁴ The bluff worked, Biograph got its terms, and in December, 1908, there was organized one of the most notable concerns in the history of the industry—The Motion Picture Patents Company. The war among the leaders was over. Patents were pooled and each member company could use them upon paying the stipulated license fee. Members were Edison, Biograph, Kleine, Vitagraph, Lubin, Selig, Essanay, Pathe, Kalem, and Melies. It was not intended to issue licenses to other producers.

This tight little group regarded the new plans with some satisfaction. It seemed to them that they had achieved a remarkable and profitable monopoly. They controlled so many patents that no independent could produce or exhibit films without becoming liable in damages for patent infringements. Those left outside were generally small fry of limited productive capacity. It seemed inevitable that these latter should perish, leaving the whole rapidly growing business to those in the combine who would then be in a position to exact their own prices from exhibitors. In order to make their plans effective, the members of the Patents Company proposed to license the exchange concerns and to limit them to dealing in licensed films only, which would be rented solely to licensed exhibitors. Licenses were to be granted only to exhibitors who used legitimate projection machines for which they paid a fee of \$2 a week.

Unfortunately for the self-chosen few these plans of glowing promise went somewhat awry. A basic change had been taking place in the industry. Whereas previously the producers had swung the real power, now the exchange men or distributors had acquired equal or greater strength. Their position between production and exhibition gave these middlemen a good deal to say about the prices paid for films and the rents charged to exhibitors. The producers had lost contact with their exhibitor-customers. Moreover the exchange men had been playing the small producers against the large with considerable benefit to themselves. Hence, when the officers of the Patents Company explained the new plan with its inhibiting restrictions to these rough-and-tumble exchange men, there

arose a howl of protest. Within a short time a good many were in open rebellion. Almost before it was a year old, the new "trust" had a full-fledged war on its hands. Some exchange men secured a supply of film from struggling, independent producers. Others produced in secrecy. Carl Laemmle, who had a big system of exchanges, boldly threw down the gauntlet and formed the Independent Motion Picture Company—"IMP."

To the hard-boiled Jeremiah J. Kennedy, head of the Patents Company, all of this seemed like so much arrant outlawry. He determined to stamp it out. He built up an intelligence service which kept him well posted on what was going on and where. His "raid and replevin" squad would descend out of the blue on unlicensed exchange men or exhibitors and seize cameras and films. Everything possible was done to enforce the rules of the trust. Nevertheless it just did not work. Violations grew apace all over the country. Before long even Kennedy realized he was fighting a losing battle. The exchange men were making lots of money and getting more independent. They were in no mood to be regulated or to become neatly tied-up packages in Kennedy's Christmas bundle.

But Kennedy could carry on a flank as well as a frontal attack. If he "couldn't fight 'em, he'd jine 'em," so he proceeded to start buying up the exchange men. Toward this end a calculated announcement was made on February 10, 1910, that the Patents group had incorporated a new concern, General Film Company, with an authorized capital of \$2,500,000. This sounded like big money to the exchange men and nickelodeon operators. It was hoped they would be awed. In a measure they were, for Kennedy proceeded to put into effect a plan for buying up exchange companies unique in American business. "Kennedy set forth to buy the motion picture business with its own money." ⁶

General Film would offer an exchange man a price for his business which was determined by the amount of film he had been taking from the Patents Company. Part of this price would be paid at the outset in the preferred stock of General Film. The balance and greater part was to be paid in cash in twenty quarterly installments over the next five years. If an exchange man demurred about acceptance, the Patents Company could cancel his license and its members refuse to sell him any more of their films. Inasmuch as the trust group accounted for the greater and better part of production, this was no empty threat.

The result was seemingly a magnificent victory for Kennedy. Within the next two years General Film acquired fifty-seven of the principal exchanges at an aggregate cost of \$794,000 in preferred stock and \$2,243,089 in cash and notes. All in all, this was an interesting piece of automatic financing. The exchange men were forced to come in and once in were

obliged to make a go of General Film if they wished to get their deferred payments.

At once General Film took steps to bring some sort of order out of the cut-throat, chaotic conditions in the industry. Its ten founder-members had already agreed among themselves on certain standards of production. Quantity output was the key word. All theaters were to be classified in relation to their size and location. Standard rentals were to be paid accordingly and preferential arrangements, as well as cut rates, abolished. Rental charges ranged from \$125 per week down to \$15 for the smallest houses. Release dates were to be rigidly observed. In addition, the \$2 per week license fee for each exhibitor was to be continued. Money began to roll into the coffers of General Film. Before long some twelve thousand exhibitors were paying the weekly tribute.

But now war broke out in a new quarter. The exhibitors began to squirm under the orderly processes set up by General Film. Meetings of protest were held and the action of the trust was denounced by growing numbers of exhibitors. For the next four years a ding-dong battle ensued. Groups of small exhibitors organized cooperative production ventures. Small independents went furtively into the business of making pictures. Most of their photography was done with bootlegged Edison machines or with others which infringed on his patents. This condition was favored by the fact that Edison had failed to take out European patents. These producers led a hidden, furtive, and fugitive existence. Trust representatives were constantly searching them out, hailing them into court, and generally making life miserable.

While General Film and the independents were fighting this war, a new factor appeared to challenge the power of both. The movie audience began to express its will. The star system was born. Although it had characterized the stage for years, its advent in motion pictures apparently took the industry by surprise. About 1909, David Wark Griffith, the production genius of Biograph, had been using a young girl in leading ingenue roles with marked success. Designated as "Little Mary," she had already registered as a box-office attraction. Patrons began to seek out "Little Mary" films. Sensing that this preference might provide the basis for more intensive exploitation, Carl Laemmle for IMP prevailed upon "Little Mary" to leave Biograph. For the first time Mary Pickford's name was advertised and her adoring fans multiplied by leaps and bounds. Other stars were also being promoted to become luminaries of filmdom. Before they realized it, producers, exchange men, and exhibitors were under the domination of this manifestation of audience preference. "And so was born the press agent's heaven, and the golden age of buncombe and hokum, in

which screen celebrities were turned into sacred cows for their fans to worship at ever increasing costs of adoration, began to spread its saccharine extravagance over the studios. . . . The star system in films was in reality created by the public, and the public has had full and undisputed charge of its creation during every moment of its history.”⁶

In the years 1912 to 1916 great changes took place. Short films and little nickelodeons gave way to feature production and the modern motion picture theater. The art of story-telling with pictures upon a screen attained new stature. As a source of entertainment, the movies advanced from childhood to youthful maturity. As a business, the industry cast aside many of the characteristics of a mining camp boom and began to organize its affairs. In the eighteen years since its birth in 1894 men had attained experience and judgment in the new field. Through strenuous processes of survival, leaders were sifted out. As had been the case in oil and steel, this industry was also to bring forth a czar in the clear thinking, unostentatious personality of Adolph Zukor.

Zukor had got into the movie business quite by chance. As an inconspicuous furrier in Chicago, he had loaned \$3000 to a friend for starting a small arcade in New York on Sixth Avenue near 14th Street. If the project had gone as expected, Zukor might have remained a furrier. But instead of returning rich reward, the enterprise lost money. Zukor was not one to take this lightly. In 1903 he came to New York to see if deficits could be turned into dividends. He succeeded so effectively that within a few years he was operating several theaters and had become a partner of the well-known Marcus Loew.

As Zukor surveyed the situation in 1912 he became obsessed with one conviction: the time had come to produce longer and finer pictures. As an exhibitor his box-office sense told him that Mr. and Mrs. Movie-goer would pay for the increase in cost. His first accomplishment in this field was to secure the American rights for the film *Queen Elizabeth* starring Sarah Bernhardt. Somewhat reluctantly this was licensed by the Patents Company. Zukor and his associates won moderate success in bringing the “Divine Sarah” to the American screen.

Now thoroughly convinced that the feature picture was the film of the future, Zukor decided to undertake its production. His first problem was to get distribution. To this end he importuned the staff of General Film. The great of the industry turned a deaf and not too courteous ear. This left Zukor with only one practical alternative. He could distribute his ambitious pictures only by securing the help of the best “states’ rights” exchange men. To produce outstanding films, he decided to seek dramatic material and talent from the stage, a field hitherto largely overlooked. Accordingly

he formed the Famous Players Company, securing for this enterprise the wise counsel of that dean of theatrical producers, Daniel Frohman. Their first production was the *Prisoner of Zenda* with James K. Hackett as star. "The intrusion of Adolph Zukor with his 'famous players in famous plays' idea, expressed in five-reel pictures, was to prove the most significant of moves in the coming revolution of pictures."⁷

About this time, others of Zukor's school of thought won striking triumphs in the new field. Among them was George Kleine of Chicago who imported the Italian eight-reel production of *Quo Vadis* and presented it on Broadway at the Astor Theater. To the astonishment of reactionaries in the industry, the admission price was one dollar. The offering was an instant success and shortly some twenty-two *Quo Vadis* films were being shown in various cities throughout the country.

To those who like to have their historical observations marked off neatly by time sequences, this presentation of *Quo Vadis* in April, 1913, may be taken as ushering in a new era. The feature film of five reels and upwards had proved its pulling power. Zukor, the Moses of Film-land, would shortly undertake the output of some twenty to fifty long pictures a year. Mutual, Independent, and Fox followed roughly along the same lines. Only the trust, General Film, failed to adjust itself to the new conditions. The short film program on which the nickelodeon had thrived was a dead pigeon. Having tied their colors to a lost cause, the once dominant Patents Company and General Film would gradually pass out of the picture.

THE GLAMOR BUSINESS

Part Two: Stars, Talkies, and Color

THE forces of revolution in the film industry were manifest in many directions. Independent "states' rights" distributors sensed that there would be high profit for them in distributing the new type feature film. Among forward-looking members of this confraternity was W. W. Hodkinson of California. Together with four like-minded independents in New York, Boston, Philadelphia, and Pittsburgh, he formed a company which would shortly wield immense power in distribution—Paramount Pictures Corporation. The stock was evenly split five ways.

Paramount would confine itself to distribution and thereby hold the balance of power which inured to that function. Its supply of films would have to be secured from the small new producers pioneering in feature-length pictures. Of these Adolph Zukor was foremost. These two leading disciples of the new school, Hodkinson and Zukor, made an alliance. For a period of twenty-five years Famous Players (Zukor) would produce only for Paramount. In return Paramount would assist in financing production by advancing to Famous Players some \$20,000 to \$25,000 per five-reel picture. The rental income received from each film would be divided 65 per cent for production and 35 per cent for distribution. As time went on this division became almost standard for the industry. Similar contracts were made by Paramount with the Lasky-Goldfish-DeMille production group as well as with the Hobart Bosworth and Frank C. Garbutt interests (Pallas Pictures and Morosco Pictures).

Having made satisfactory arrangements to secure films, Paramount was able through its "states' rights" distributors to promise exhibitors one or two features a week. Meanwhile public interest was mounting. Exhibitors increased the prices of admission and Paramount soon found it could rent a five-reel film for \$500 to \$700 per week as compared with the \$100 to

\$150 or so charged by General Film for its one- and two-reel pictures. Everywhere customers were deserting theaters showing programs of short films for those dedicated to the new features. The tide ran so strongly that within a few years Paramount's films were being shown in five or six thousand theaters throughout the nation.

As if to mark with unforgettable emphasis the advent of the new era, a notable picture was produced in 1915. David Wark Griffith and associates presented *The Birth of a Nation*. Its brilliant success followed a nip-and-tuck battle to finance production. A special corporation had been formed to assume the burden of financing the picture with its unprecedented length of twelve reels. The cost was to be between \$75,000 and \$100,000. Several times the enterprise ran out of backers only to find others willing to take a chance on what seemed a highly risky venture.

After some preliminary tryouts, *The Birth of a Nation* had its New York premiere on March 3, 1915, at the Liberty Theatre with a top admission price of \$2. It created a sensation. From the box-office point of view it outdid the dreams of its progenitors. In showings over its first fifteen years *The Birth of a Nation* grossed between \$15 million and \$18 million and is said to have realized net profits of \$5 million.

Concurrently with such legitimate accomplishments, the industry indulged in some fantastic adventures. Not the least of these was the arrangement between Mutual Film and Pancho Villa. This lusty outlaw had announced that he and his "army" were about to launch a hard-riding campaign to "liberate" Mexico. Villa let it be known that he would sell the exclusive movie rights to photograph his proposed war of liberation. He found a gullible taker in Mutual which paid down \$25,000 for the alleged rights, with an agreement to give Villa an additional percentage. The *opera bouffe* campaign was started and Mutual shot the storming of the adobe village of Ojinaga. The results were disappointing. Villa's army proved to be an inadequate cast almost wholly concerned with seeking cover when action threatened. Worse still, Villa himself, with the true Hollywood touch, insisted upon lengthy footages of closeups. He was, to use the vernacular of the trade, a Mexican "lens louse."

The success of the new feature films fostered two other developments, the building of great centrally located "palace theatres" and competition for stars. If exhibitors must pay higher film rentals, then obviously it was advisable to have larger theatres. Besides, the public itself was eager for better facilities. New show places of large seating capacity developed. The old store-show nickelodeon theatre with its 100 to 200 seats was consigned to the limbo of forgotten things. A boom in motion-picture theatre building got under way.

More sensational, however, was the boom in the business of being a movie star. When, back in 1910, Carl Laemmle and his associates had the idea of publicizing the real name of "Little Mary," they released forces whose strength they did not dream of. In building up a star a producer sold himself from a position of power to one of dependency. The wider the star's fame, the greater the box-office take; but the higher the revenues, the more the star demanded—and got. Producers found themselves presenting personalities rather than plots. The resulting condition was unique in business annals—a handful of employees had come in effect to dictate to an entire industry.

This was highlighted by the fantastic soarings of Charlie Chaplin and Mary Pickford into positions of effulgent prosperity and industrial power. Chaplin came to this country in 1913 playing small pantomime parts as a clown in an English traveling show of indifferent merit. In 1914 he entered the movies with Keystone Comedies at a salary of \$150 per week. Almost at once his screen appeal became evident. With Essanay in his second movie year he was paid \$1,250 a week. As this contract was about to expire, Charlie decided to listen for siren music from other producers. It was not only forthcoming but resulted in a hectic scramble. The unknown English clown had become a box-office sensation. Mutual finally agreed to pay the diminutive comedian compensation in inverse ratio to his size. Charlie received the hitherto unheard of salary of \$10,000 per week plus an annual bonus of \$150,000.

Constantly rising also was the power in the name of Mary Pickford to pull paying customers to the box office. Nor were Mary and her manager-mother shrinking violets in advancing their ideas of Mary's worth. After Chaplin's famous contract with Mutual, Adolph Zukor, in order to continue control of Mary Pickford features, was forced to guarantee her a salary of \$7,000 a week plus a bonus and one half the profits on her films, which were to be produced by a concern organized solely for that purpose—Arctcraft Pictures Corporation.

It was inevitable that in addition to these stars of greater magnitude others of varying powers of attraction should be developed. Several dozen actors and actresses were added to the firmament of filmdom. Salaries were increased all along the line so that the acting profession, hitherto one of the most underpaid, became a veritable El Dorado. Gradually these stars instead of revolving around producer-suns reversed the situation. Soon producers, distributors, and exhibitors were caught in the new system. The whole industry revolved around the new stars. By 1917-1918 the star system had so completely taken hold that out of about 600 feature films

produced per year only a scant 5 per cent appeared without star names in the leading roles.

Having pioneered in the introduction of feature pictures, Adolph Zukor showed himself quite capable of handling his interests under the new star system. In Mary Pickford he held the highest card and he added others until he had by all odds the greatest aggregation of stars in the industry. At the same time Zukor was on the march in other directions. With his Famous Players as a nucleus, he brought together three other prominent producers, Lasky, Pallas and Morosco. Then to provide a controlled organization in the field of distribution, he acquired Paramount. Thus within a few years Zukor won leadership in the industry.

But this one-time furrier was not allowed to wear his new crown in relaxed composure. There were many in the industry who disliked his increasing dominance. Shortly an aggressive counteroffensive was started by rebellious exhibitors. *Causus belli* was a situation which was largely blamed on Zukor. Keeping pace with the rapidly advancing remuneration paid to stars, he, like other important producers, had been increasing the rental charges for the feature films in which the stars appeared. In addition he had come out strongly for "program booking." This was the plan under which an exhibitor in order to get any of a producer's output must contract in advance to accept an entire group of films. More galling than this, however, was the fact that Zukor began to give preference to those theatres which showed only films made and distributed by his companies. Memories of General Film domination were revived and fear grew in regard to Zukor.

The revolt spread rapidly. At long last, the exhibitors, the final retail outlet for the product, were rising to the position of ultimate power. Their struggle to capture authority might well be called the War of the Theatres. Theatre owners took the offensive. Thomas L. Talley, a well-to-do exhibitor, and John D. Williams brought together a group of prominent theatre operators in key cities. They planned to produce and distribute their own pictures. Organized in 1917 as the First National Exhibitors' Circuit, some twenty-five or thirty exhibitor members were to enjoy franchises for their respective districts and in return underwrite the costs of film production. The organization included an important group of first-run theatres which were active customers of Zukor's Paramount. In addition First National issued sub-franchises and took in other theatres so that ultimately upwards of 5000 theatres were represented.

The advent of First National stirred members of the industry from coast to coast. Exhibitors both large and small were thrilled at the prospect of successful revolt after what they considered years of paying tribute to dis-

tributors and producers. Here at last was a vision of the Promised Land where they could produce their own films and determine their own charges. Great was the rejoicing among them when it was learned that the new concern had brought off the coup of taking Charlie Chaplin away from Mutual. In the ballyhoo attendant upon this change, it was stated that Chaplin's compensation would amount to upwards of \$1 million a year.

No one had to explain the significance of these developments to Adolph Zukor. The emergence of exhibitors to a position of power indicated clearly their inherent strength. Henceforth success in production would depend upon control of marketing outlets—the theatres themselves.

Thus early in 1919, in an experimental skirmish, we find Zukor acquiring four leading first-run theatres. From this sortie he concluded that a full-scale campaign was practical. He would win sufficient power to combat any organization of exhibitors. Moreover he saw that exhibition of pictures was profitable in its own right.

To wage war on a grand scale Zukor needed large resources. Accordingly he paid a visit to Wall Street, the first important move of that kind for the industry. Through Kuhn, Loeb & Co., Famous Players sold a \$10 million issue of preferred stock, the proceeds of which were to be used in buying up leading movie theatres.

Once launched, Zukor's offensive was carried on with boldness and vigor. Interests were purchased in local theatre groups and booking offices, some of which were important members of First National. A ruthless drive was carried on in the South. Zukor's agents would go into communities and propose the construction of new theatres. Local banks would become frightened because of loans to existing operators and would urge the latter to sell to these rough-shod adventurers who represented a great corporation with almost unlimited funds. It was a war of nerves. If small operators could not be bought out, competing theatres were started. When land was actually purchased in a new city, local banks and capitalists vied with one another to lend funds to a company apparently so strong and successful. Gradually word spread, fear increased, and Zukor was able to buy about what he wanted. When the turmoil of battle ceased, Paramount had acquired control of several hundred theatres, many of them important first-run houses. Furthermore, through certain acquisitions, Zukor's adherents sat in on the councils of First National.

Awakened by the success of First National and Zukor's aggressive campaign, the whole industry suddenly came to realize the power inherent in the position of exhibitor. Control of the theatre was the control of all. Integration and consolidation became the order of the day. Marcus Loew,

operator of leading first-run theatres, took up the production of films, thus achieving complete vertical integration as had Zukor by purchasing theatres. Concurrently individual theatre operators became members of local circuits under consolidated management. The movement spread progressively throughout the whole industry. Gone was the heyday of individual operation when the man of insignificant capital might entertain reasonable expectations of making a fortune. "The concentration of theatre control into a few corporations was proceeding rapidly, and by 1924 nearly all of the first-run houses in the United States and Canada had been acquired by Paramount, Loew's Inc., the Stanley Co., and large circuits affiliated with the Zukor, Loew, Mastbaum, and First National groups. Fox retained his chain, Universal had several houses and the Goldwyn-Godsol group had several." ¹ The movie business had become Big Business.

More significant still, it had also become a closed business. This arose from the fact that the local theatre circuit even though autonomous in management depended upon the few big integrated organizations for its supply of film. While in theory the small local circuits could have entered into production, practically they realized that the attempt would mean a hard competitive battle with the big integrated companies such as Paramount, Loew's, and First National, each of which controlled enough theatres to ensure adequate rentals for their own productions. As a result the lot of the independent producer became miserable indeed. Controlled theatres meant a controlled selection of pictures. The powerful few were taking care of their own. "Occasionally an independent production broke through the lines of Paramount, First National and Loew to win success but even in such instances victory was merely temporary, leading to nothing substantial or permanent." ²

While these important changes were taking place in the industry, some of its members had been sowing a rather lusty crop of wild oats. The big easy money of its hectic years spilled over into hands eager for splurge and definitely lacking in self-control. Certain more or less prominent members of the movie colony became involved in murder cases, suicides, divorces, and miscellaneous breaches of the peace. Hollywood morals and conduct became a national scandal. Concurrently certain producers in an endeavor to create box-office income had been putting on some questionable productions devoted to crime and sex. In many quarters public opinion became aroused, movie attendance fell off, and agitation for censorship increased. In 1922 bills for censorship of films were sponsored in the legislatures of thirty-two states.³ The industry was rapidly acquiring a bad reputation. Worse than that, its independence and pocketbook were threatened.

Obviously something must be done. In providing a solution, the industry accomplished a notable piece of organization and self-discipline—not without a struggle, however. Had it not been for the outstanding qualities of the man who led the effort, the result might have been a particularly inglorious failure. In securing Will H. Hays in 1922 to head the newly formed Motion Picture Producers and Distributors of America, Inc., the leaders of the industry were fortunate in the extreme. Hays had tact, judgment, and patience. More important than all, he had common sense.

At the outset he insisted that the industry rid itself of those few irresponsibles who were bringing it a bad name. Each producer was to see that members of his business family comported themselves so as to avoid unfavorable publicity. There were changes and retirements. A moderately good cleanup job was done. A central employment bureau was established and a campaign inaugurated to slow down the influx of movie-mad girls to Hollywood. A production code was adopted which gave general guidance for avoiding presentations that might offend. Scripts, separate sequences, and completed films were reviewed by an industry authority and questionable matter deleted. Heavy fines were imposed for infractions. In spite of an occasional lapse, the plan of self-regulation proved reasonably successful and censorship ceased to be a threat.

On other problems the Hays office also made progress. A standard form of exhibitors contract was worked out and a system of arbitration adopted for settling the myriad disputes with which the movie business had been perennially accursed. The effectiveness of these measures was, however, mitigated because some were held to be in restraint of trade. When any large industry undertakes self-regulation the proper line between legitimate organization and restraint of trade is difficult to draw.

The year 1926 has been accepted as marking the end of one epoch in the motion picture industry and the beginning of another. The preceding years had witnessed the zenith of the silent film. Then in 1926 came sound projection.

Of course the idea of the talkie was not new. We have seen that Edison's invention of the Kinetoscope developed from his efforts to combine his phonograph with moving pictures. However nothing of importance was accomplished to advance this conception until after World War I. The industry was occupied with more immediate problems.

But in the next few years conditions began to favor a change. The silent film business had been overbuilt. There were too many theatres and admission prices had been raised to such a point that attendance was falling off. Furthermore there was distinct evidence that the public was beginning to tire of the run-of-the-mill product. Films of exceptional quality did well.

The average was received with little interest. In 1920 radio broadcasting started and by 1925-1926 network broadcasting was operating with outstanding success. The movies faced a new competitor.

The scientific achievements which gave us the radio also stimulated the evolution of the talkie. By 1924-1925 American Telephone and Telegraph, General Electric, Westinghouse, Radio Corporation, as well as Lee De Forest, all held patents that had a bearing on the development of the sound film. The engineers who were experimenting with sound projection were proceeding along two main highways. The Telephone group was attempting to synchronize sound from a phonograph disk with movement on a film. Other engineers were using the sound-track-on-film principle by which a simultaneous record was made on the film as the pictures were taken, to be translated into sound by a beam of light when the film was run through the projection machine.

Early demonstrations of equipment made to apply these two principles were not impressive. Sound came through all right but it was harsh, raspy, and unreal. Leading movie producers agreed that the innovation would repel rather than attract audiences. They decided to let others pay the expenses and take the risks of experimenting. In the end this was to prove a costly mistake. There happened to be some who believed that the early results could be vastly improved. William Fox gave his support to Movietone which employed the sound-track-on-film method. The Warner Brothers took up Vitaphone, the A. T. & T. equipment for sound production from synchronized records. Their adventures constitute one of the most dramatic success stories in the industry.

The record of the Warner Brothers in the movie business had followed the orthodox pattern. Starting as nickelodeon operators, they grew with the industry to engage in both exhibition and distribution. Finally they undertook the production of films. Unfortunately in this latter function their entrance was late. They started producing at a time when their competitors had thrown discretion to the winds and were spending money lavishly in making feature films. The Warners thus found themselves fighting not only a keen competitive battle but also struggling mightily to secure capital with which to continue. They received substantial assistance both from the banks and Wall Street. This did not suffice. Lacking control of first-run theatres they did not seem able to turn their production investments into profits. Finally, after a series of heavy deficits, it began to look as though Harry, Sam, Albert, and Jack Warner were headed for the Wailing Wall. Failure seemed inevitable.

It just so happened that at this time the A. T. & T. Vitaphone, which had been rejected by other producers, was offered to Warner Brothers.

With perceptions somewhat sharpened by adversity they seized upon it with enthusiasm. Sam Warner reported, "It's far from perfect, but it's farther along now than films were when they first swept the country. It can be improved rapidly, and it will sweep the world." ⁴ Warner Brothers secured from A. T. & T. and Western Electric the exclusive right for a term of years to use its sound equipment. Squeezing out one more loan from friendly interests, they embarked upon the production of short talkies.

Their first films and those of Fox's Movietone appeared at about the same time in 1926. Initial success was not startling. Sound production was imperfect and critics were loud in its condemnation. Leaders of the industry watched with skepticism, not unmixed with apprehension. The answer lay in audience response. It was not slow in coming. Theatres showing talkies were doing more business each week. Public interest was definitely aroused and, as the technique of sound pictures was quickly improved, it became unmistakably enthusiastic.

As if to climax this mounting popular favor of the new talkie, Warner Brothers produced a sensational film. They presented a full-length feature musical, *The Jazz Singer*, with Al Jolson as its star. Its production was a stroke of fine showmanship. Enthusiastic audiences greeted it everywhere. Even the most skeptical were now convinced. Warner Brothers, after their lean, discouraging years, had finally struck gold. The talkie had won its place. The silent film was on the way out.

The impact of this change shook the industry. Production methods were drastically altered. Among the players panic reigned as new requirements of voice, intonation, and presence in speaking roles tumbled screen favorites from their dizzy heights. Heavy new capital outlay was required both in production and exhibition. While more costly to produce, talkies secured longer runs and in general yielded higher profits. Extended showings meant fewer films—a fact which struck still another blow at the fast-weakening star system.

The field of exhibition was also bubbling with new ferment. Orchestras were dispensed with as "canned" music became available and many musicians lost employment. Numerous theatre operators feared to make the capital outlay needed for conversion to the talkie and sold out to the big integrated companies. The power of large first-run theatres was enhanced. Warner and Western Electric granted exhibition rights to Paramount and Loew. In return Warner productions were shown at leading first-run theatres. After a vain struggle to separate the industry into compartments related to patent ownership, a common-sense solution was reached when the principals agreed to permit use of equipment by all

comers, both in production and exhibition, who would pay the standard fees. Shortly, with profits running into many millions, Warner Brothers was able to acquire control of First National theatres, thus achieving complete integration. Meanwhile Radio-Keith-Orpheum Corporation, an affiliate of Radio Corporation of America, had entered the industry in a big way to engage in production, distribution, and exhibition.

While sound projection was thus winning its place in the 1920s, another major technological advance was hanging over the heads of the still somewhat bewildered motion picture magnates and their players. Colored movies appeared. In concept this was far from new. Back in 1912, about the time Zukor was promoting the feature film, Charles Urban in London had created a sensation with his colored film of that highly picturesque spectacle, the Indian Durbar. Further development in this field was retarded by World War I.

Effective acceptance of the new art came when Dr. Herbert T. Kalmus launched his venture, Technicolor, in this country. Dr. Kalmus, previously a professor at the Massachusetts Institute of Technology, together with some associates had worked out a successful process of color photography and projection. Highlighted by the production of *The Gulf Between* in 1917 and *The Black Pirate* with Douglas Fairbanks in 1925, they struggled with the intricate technical problems involved.

Public enthusiasm over the colored film ran ahead of performance. After a short boom in 1929-1930 there was a setback for several years during which Dr. Kalmus and his fellow scientists endeavored to overcome the imperfections of their early effort. Gradually these difficulties were surmounted and a successful commercial process was evolved. The new films were superior in every way, yielding such well-known triumphs as *The Three Little Pigs* and *Snow White and the Seven Dwarfs*. Thus did color in the late 1930s win entrance into the most spectacular of all amusement industries. Since then its growth has been rapid and sustained.

Following the advent of sound and color projection we find the motion picture industry displaying the pattern by which we know it today. Once the Happy Hunting Ground of the little business man, it had become dominated by the large integrated companies. As we have seen this was a long process in which the struggle for ascendancy waged back and forth between producers, distributors and theatre operators. In the end, conforming to trends which we have noted in other large industries, integration and concentration became the established order. Because of their activity in production, distribution and exhibition, the following concerns grew to occupy positions of extraordinary power—Paramount, Loew's, RKO, Warner Brothers and Twentieth Century-Fox.

Such concentration of business did not escape the eyes of the Federal Trade Commission and Department of Justice. Ever since 1929 these large integrated companies have been under attack for alleged violations of our anti-trust statutes. Government officials charged restraint of trade in methods of film distribution and theatre operation. The questions raised were both numerous and highly technical. This whole basket of hot potatoes was dumped unceremoniously into the laps of the Justices of the United States Supreme Court.

In May of 1948 the court handed down its decision.⁴ Various practices of the industry were held to constitute unlawful restraint of trade. These included "block-booking," "blind selling," price fixing and certain "clearance" arrangements. As to the ownership and operation of theatres, important questions were remanded to the lower courts for further hearing. Hence this industry, as is the case with certain others, now faces some major adjustments in operation resulting from our attempts to maintain open competitive conditions through the anti-trust laws.

RADIO

Part One: Early Days

FROM the business point of view, the field of radio communication opened on July 20, 1897, when the "Wireless Telegraph and Signal Company Ltd." was incorporated in England with an original capital of £100,000. Its chief engineer was a young Italian, just twenty-three years of age, whose patents had been acquired. His name was Guglielmo Marconi.

When Marconi began his experiments with wireless in the prosaic surroundings of his father's vegetable garden at Bologna, he was the beneficiary of a rich scientific inheritance. As early as the 1830's, and 1840's, Joseph Henry in the United States and Michael Faraday in England had observed phenomena of electric induction and had speculated about the existence in space of an electromagnetic conducting medium. In the 1860's James Clerk Maxwell proposed certain mathematical laws governing the propagation of electromagnetic forces through space, among them the conclusion that these impulses travel with the velocity of light. Then in the 1880's came the great experiments of Heinrich Rudolph Hertz. He invented methods of projecting and detecting electromagnetic waves by means of which Maxwell's theories were confirmed. Hertz showed not only that these mysterious impulses sped through space with the velocity of light but also, like waves of light, they could be reflected, refracted, and focused. In 1892 Sir William Crookes suggested the possibility of using the so-called "Hertzian waves" for communication across space.

Marconi's genius lay in his capacity to reduce these conceptions and discoveries to practical application. In 1895, using apparatus similar to Hertz's, a Morse telegraph key, and an improved Branly wave detector, he was sending and receiving telegraph messages through the air for distances of a mile or more. Going to England the following year, Marconi took out

patents and was encouraged to press ahead with commercial application by Sir William Preece of the British Post Office and Sir Oliver Lodge, the noted English scientist. Gradually he improved his apparatus and sent messages over greater distances. When he came to the United States in 1899, Marconi demonstrated his system to the United States Navy over short distances (20-36 miles) and then organized The Marconi Wireless Telegraph Company of America—"American Marconi"—in which the British Marconi held a substantial interest.

Marconi's experimental work was so rewarding that by late 1901 he was ready to try spanning the Atlantic—a distance of some 1800 miles. When the time came for the supreme test, Marconi set himself up in an improvised station near St. Johns, Newfoundland. On December 12th of that year came the climactic success which Marconi described as follows:

On arriving in Newfoundland and installing my station on Signal Hill, at the entrance to St John's, I sent up kites every day this week with the vertical aerial wire appended by which our signals are received. I had previously cabled to my station at Cornwall to begin sending the prearranged signal. On Wednesday my kite blew away, and nothing resulted. Thursday however, I had better luck. My arrangement was for Cornwall to send at specific intervals between 3 and 6 o'clock P.M. the Morse letter "S," which consists of three dots thus (...). The hours were equivalent to from noon to 3 P.M. at St. John's, and Thursday during these hours myself and my assistant, Mr. Kemp, received these signals under such conditions as assured us they were genuine.¹

Stimulated by the accomplishments of Marconi, other inventors both here and in Europe bent their efforts toward wireless development. Not the least of these was a young American, Lee de Forest, who had worked out a wireless detector of his own. Hoping for a sensational public demonstration of its effectiveness, de Forest borrowed \$1,000 to install his equipment aboard a tug and set out to report the International Yacht races of 1901. The Marconi people had made similar arrangements with another news service. Sad were the results on the day of the great race. Each of the two wireless systems jammed the other and the news-receiving stations on shore heard only a jumble of undecipherable signals.

But the technical problems of the new field were being rapidly surmounted. Range of transmission was increased and efficiency of receivers improved. The first commercial application to which the Marconi companies directed their attention was that of wireless telegraphy as an aid to navigation. The ability to communicate instantly across great distances from ship to ship or from ship to shore through all kinds of weather was an advance in the science of navigation second only to the invention of

the compass and the use of the sextant. This application of wireless was dramatically publicized by sensational ocean rescues.

News service and weather reporting came along next, together with a growing volume of commercial usage in connection with marine transport. Meanwhile application of wireless to the navies of the world called for large amounts of equipment. This new system of communication was definitely on the march. In certain aspects it was unique. Its very essence was international. Electromagnetic waves traversing space recognized neither physical nor political boundaries.

Marconi and his British associates had achieved a powerful lead over competing companies. German interests strove valiantly but accomplished little on the international scene. British Marconi took over an important French company in 1913. The situation in the United States was dominated by American Marconi which was of course a satellite of the British company. The former had absorbed the United Wireless Company, its chief competitor, and had made traffic arrangements with Western Union. The most active concern remaining to compete with the Marconi group was the Federal Telegraph Company which had acquired rights to use the well-known Poulsen arc-transmitters. It operated a few stations on the Pacific Coast. But in the advancing technology of this new science we were in no sense laggard. The General Electric Company, the United Fruit Company (The Tropical Radio Company), as well as inventors such as Fessenden and de Forest were acquiring the know-how which was to provide a sound foundation for later accomplishments.

As British Marconi gained headway in these early days, plans of its officers became more ambitious. They envisaged a globe-encircling system which would redound to the power of the Empire and to the profit of Marconi stockholders. "In 1913 the Marconi companies had either secured or were negotiating for concessions in more than twenty foreign countries. The Marconi system promised to assume colossal proportions."² Authorized stock of British Marconi was increased with persistent regularity from £100,000 in 1897 until it reached £1,000,000 in 1911 and £4,000,000 in 1922. As World War I broke out, Britannia not only ruled the ocean waves but those of the ether as well.

With wireless telegraphy a practical accomplishment, it was only natural that thoughts should turn to wireless telephony. As a matter of fact this conception was not entirely new. In the 1880's Bell had experimented with a wireless telephone using light waves for transmission. When wireless telegraphy became a reality, the science was on firmer ground. Among the engineers who began to attack the problem of transmitting sound through the ether was Professor Reginald A. Fessenden of the

University of Pittsburgh. He had previously secured the financial backing of Thomas H. Given and Hay Walker Jr. They had organized a pioneer wireless telegraph enterprise, the National Electric Signalling Company. While grappling daily with the problems of telegraphy, Fessenden's mind was bewitched by the more distant vision—the use of Hertzian waves for carrying modulated sound across space.

The problem of transmitting the human voice over the air presented serious technical difficulties. In wireless telegraphy the required signals were propagated simply by the regulated interruptions of antenna current. Sounds audible to the human ear, however, consist of a series of wave vibrations which vary over a range of frequencies extending from slightly less than 50 to about 15,000 cycles per second. In order to record these variations in sound-wave frequencies Fessenden envisaged a flow of electromagnetic or radio waves of much higher frequency upon which the sound-wave variations could be superimposed. He wanted frequencies of around 100,000 cycles per second. The best so far obtained were 5000–10,000 cycles. With the assistance of E. F. W. Alexanderson of the General Electric Company, Fessenden finally secured an alternator capable of 50,000 cycles which was installed at Brant Rock, Massachusetts, in September 1906. It was only half a loaf, but sufficient to enable Fessenden to demonstrate his theories in a dramatic way.

On Christmas Eve, 1906, wireless telegraph operators along the Atlantic Coast and on nearby ships, with earphones in place, were going through the monotonous routines of their work. Suddenly they were stunned. Instead of the regular buzz-buzz of the telegraph, a human voice was coming over the air. They listened with incredulity. Ships' officers were called as witnesses to this seeming miracle. Not only speaking voices but a violin solo was heard. Fessenden with his new alternator had succeeded. He had proven radio telephony to be practicable. This was, in effect, the first radio broadcast.

About this time (1906) another important technological event occurred. Brigadier General Henry H. C. Dunwoody, USA (ret.), and G. W. Pickard each discovered crystal radio detectors. As receiving devices these possessed the great advantages of being cheap, easy to operate, and relatively effective. Their introduction gave a great impetus to amateur building of home radio sets. Up to this time manufacturers were concerned solely with commercial and military requirements. "Thus at the very period when it was important that the general public be educated to the possibilities of radio the efficient crystal detector came along to boost the industry."³ Thousands of young "hams" now began to tinker not only with receiving sets but with crude transmitters as well.

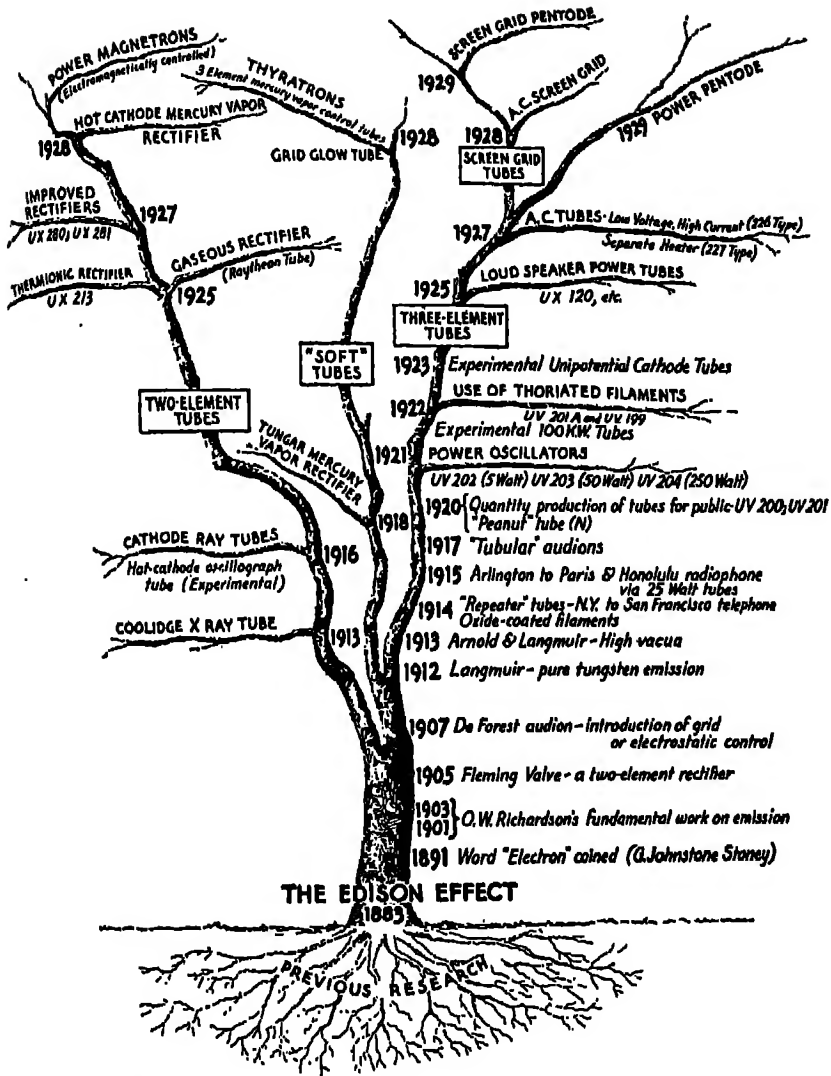
Meanwhile Alexanderson at the General Electric Company, was pushing forward to open a greater future for wireless. In 1909 he succeeded in building an alternator which operated at 100,000 cycles—the machine which Fessenden had hoped to secure. Then having achieved the production of high-frequency radio waves, he worked out a practical method of hooking them up with a delicate microphone. Finally, in 1916, Alexanderson evolved a multiple-tuned antenna of great efficiency. Thus as we were being drawn into the maelstrom of World War I Alexanderson developed a system of wireless telegraphy especially effective in long-distance transmission.

Upon receiving word of these accomplishments, Marconi acted with decision. He came to the United States, visited Schenectady and talked with Alexanderson. He examined the new 100,000 cycle alternator. Marconi was big enough to recognize the genius of others. Accordingly a deal was worked out whereby Marconi companies would be given exclusive rights to employ Alexanderson alternators provided they ordered a specified number from the General Electric Company, which retained exclusive rights to manufacture. The arrangement was not concluded because preoccupation with the war prevented its consummation.

While the British had outdistanced us in the commercial application of radio, we were more than holding our own in the onrush of technological development. It so happened, however, that the honor of discovering the greatest wireless improvement following Marconi's original invention was to be shared between the two countries. Fleming, an Englishman, and de Forest, an American, gave the world one of the greatest achievements in applied science—the miracle-performing radio vacuum tube.

It all started back in the misty dawn of the electrical era when Edison in the late 1880's was experimenting with the incandescent light. He chanced upon the discovery that if two electrodes of certain types were placed within an evacuated glass bulb, there took place a "leakage" of current across the small space between the two electrodes. Strangely enough this arrangement permitted the passage of a current in only one direction. The device exercised a capacity of selection. This entire phenomenon was thereafter known as the "Edison effect," but no practical importance was attached to it.

Then in the early 1900's, as wireless telegraphy came in, one of Marconi's assistants suddenly bethought himself of the "Edison effect." Dr. J. Ambrose Fleming sought to reduce the frequencies in receiving antennae currents. He perfected the Edison arrangement and took out patents on what then became known as the "Fleming valve." It comprised a small



The family tree of the thermionic tubes

Early development 1883-1929. Since then a multitude of other branches have been added

Courtesy of *Electronics*, McGraw-Hill Publishing Co., Inc.

glass bulb of high vacuum inside of which was a carbon or wire filament as one electrode. Around this filament, but not in contact, was a metallic plate serving as the second electrode. Both were connected by wire with

the outside of the bulb. The little gadget fulfilled Fleming's purpose excellently. But its full destiny was yet to be disclosed.

Meanwhile Lee de Forest, that rare genius and stormy petrel of the American radio industry, had been experimenting along similar lines. At this point he came upon a great discovery. De Forest inserted a small grid of fine wire between the two electrodes within a vacuum tube of the type which Fleming had developed. This grid was activated by an electric current flowing through a small wire connected with the outside of the bulb. Regulation of this grid current, in reference to that between the two principal electrodes, added marvelously to the effectiveness of the device. The result was the three-electrode thermionic valve—the so-called audion tube.

The final touch came when Irving Langmuir, of General Electric, and Arnold, of the American Telephone and Telegraph Company, conceived the necessity for, and perfected the means for attaining, a higher vacuum within the tube. Only then was its extraordinary power and broad versatility manifest. It could be used for detecting radio waves. It could be employed to propagate them. It would transform alternating current into pulsating direct current. It would serve to extend ordinary wire telephony over greater distances, making transcontinental service practical. It would take the almost imperceptible radio currents which receiving antennae captured from the air and magnify them to useful proportions. By employing a series of these tubes amplification could be run up to undreamed-of ratios. In the miracle-performing radar equipment of World War II amplification was carried to the mind-baffling extent of a million times a million. This mysterious little brain child stemming from the Edison, Fleming, de Forest family tree constitutes one of the greatest discoveries of all time. In a word, this scientific Aladdin's Lamp made man the master of a new universe.

The growth of this business of hurling messages through space brought its own problems. With the advent of the crystal receiver, the rapidly growing army of amateur operators included many irresponsibles. Legitimate transmission of messages was often interfered with. Some of these misguided tinkers even went so far as to broadcast distress calls for rescue at sea. In the field of patents there was much confusion and litigation. Uncertainty concerning the rights to manufacture de Forest's audion was particularly disturbing.

On the financial scene, there were some sensational developments. In 1912 the British Marconi Company became involved in a scandal. Its ordinary shares had been bid upon from £1 in 1910 to almost £10 by 1912. Speculators rushed in on word that a favorable contract had been worked

out with the British government. Suddenly the bottom fell out of this market. Public officials were accused of using confidential information for personal advantage. Many people lost money and the incident received unfavorable notoriety.

In America one of the early concerns, the United Wireless Company, was forced into receivership and ultimately into the hands of American Marconi because of a somewhat casual regard for Marconi patent rights and irresponsibility in selling stock. Then in 1913 Lee de Forest was tried in the federal court on charges of having used the mails to defraud innocent purchasers of stock in his company. The District Attorney was particularly outraged that de Forest had made the statement that within a few years the human voice would be carried by radio across the Atlantic. Fortunately de Forest was acquitted!

In various ways this man de Forest was keeping pretty much in the public eye. In 1908 he made a wireless telephone broadcast from the Eiffel Tower in Paris which was heard as far away as Marseilles. Two years later he broadcast from the Metropolitan Opera House in New York a double opera program with Enrico Caruso as star. This was heard by a handful of listeners in and around New York. Then in 1913 and 1914 he sold to the American Telephone and Telegraph Company rights to use the audion tube both for telephonic and radio purposes.

Our entrance into the War in April, 1917, caused great changes in this newly born industry. The government took over all commercial transmitting stations such as those operated by American Marconi and Federal Telegraph, together with their skilled personnel. Amateur stations were closed for the duration. Patent rights were subordinated to war needs of the nation. Manufacturers must devote themselves to government requirements. In effect the whole business was brought under the direction of the Navy Department which itself had been a pioneer in the field. Wireless telegraph played a major part in waging war both on sea and land. As is usual under war conditions important technological advances were made. On the plane of world politics new horizons were opened when President Wilson used the wireless to promulgate his famous "Fourteen Points" to the German nation.

As the war ended certain government officials opposed the restoration of the wireless industry to its former private-enterprise status. Instead they sought a continuance of federal control. Men like Secretary of the Navy Daniels envisaged retention of wireless communications in a government department. One of the ravages of war seems to be that disturbance in the brain cells of public officials which causes them to seek a perpetuation of wartime powers into a peacetime economy. Congress, more

intimately attuned to public opinion, was of a different mind and early in 1920 wireless communications were restored to former ownership.

Following the war the situation was ready for change. Our people had become internationally expansionist in outlook. We had, so to speak, rediscovered foreign trade. We were seeking new areas of commercial conquest. But we found Great Britain in control of most of the world's cable facilities, some of which were inadequate for existing needs. Our only large wireless company—American Marconi—was restricted by its license to United States territory and was looked upon as an affiliate of the British company.

Within the United States a snarl of confused patent rights was threatening to tie up the progress of the whole industry. Most seriously involved was the new miracle device, the thermionic vacuum tube. The production and use of this increasingly important appliance was held up by a dog fight between three of our large corporations which had acquired the basic patent rights of Fleming, de Forest, Langmuir, and Arnold. On this condition the Federal Trade Commission reported:

It seems, therefore, that the best known form of vacuum tube could not be manufactured by the Marconi Company of America unless it had rights in the de Forest patents, and in the patents on pure electron discharge tubes. The American Telephone and Telegraph Company could not manufacture such tubes for radio purposes unless it acquired rights in the Fleming patent and cleared up the interferences of the Arnold application with the Langmuir application on pure electron discharge tubes, while the General Electric Company could not manufacture, sell, or use such tubes for radio purposes unless it acquired rights in the Fleming, de Forest and Arnold inventions.⁴

The situation in American wireless called stridently for better organization. Such measures were promptly forthcoming. Oddly enough they were proposed by government rather than by the industry. Representatives of the Navy Department came forward with suggestions which resulted in the formation of a great corporation designed to take over all American wireless facilities and consolidate the patent situation. This idea stemmed from the concern of the Navy Department over the military importance of wireless in the event of another war. Beyond that, however, it involved strategic moves on the international chessboard aimed at securing for the United States a dominant position in this new field of worldwide communication. President Wilson was keenly interested. His great prestige in Europe was due in no small measure to this new form of communication which could penetrate to the people of all nations, irrespective of boundaries and barriers.

The immediate occasion for the Navy's proposal was the renewal after the war of negotiations by the British and American Marconi Companies in an effort to acquire from the General Electric Company exclusive rights to the Alexanderson alternator. This machine had been perfected and was considered by many the most effective device for long-range propagation of wireless messages. When officers of the Navy Department heard of these developments they became genuinely alarmed. They knew that British interests were bent on securing a tight hold on a worldwide wireless system but saw no reason why American inventions should be used to that end.

Rear-Admiral William H. G. Bullard and Commander Stanford C. Hooper paid a visit to the General Electric Company in New York in April, 1919, and talked with its officers. Subsequently Owen D. Young, then an executive and its general counsel, related the incident as follows:

Admiral Bullard and Commander S. C. Hooper came to my office, and Admiral Bullard said that he had just come from Paris, at the direction of the President, to see me and talk with me about radio.

He said that the President had reached the conclusion, as a result of his experience in Paris, that there were three dominating factors in international relations—international transportation, international communication, and petroleum—and that the influence which a country exercised in international affairs would be largely dependent on their position of dominance in these three activities; that Britain obviously had the lead and the experience in international transportation—it would be difficult if not impossible to equal her position in that field; in international communications she had acquired the practical domination of the cable system of the world; but that there was an apparent opportunity for the United States to challenge her in international communications through the use of radio; of course as to petroleum we already held a position of dominance. The result of American dominance in radio would have been a fairly equal stand-off between the U. S. and Great Britain—the U. S. having the edge in petroleum, Britain in shipping with communication divided—cables to Britain and wireless to the United States.

Admiral Bullard said that the President requested me to undertake the job of mobilizing the resources of the nation in radio. It was obvious that we had to mobilize everything we had, otherwise any of our international neighbors could weaken us tremendously by picking out one little thing. The whole picture puzzle had to be put together as a whole in order to get an effective national instrument.⁵

Admiral Bullard's suggestions were met with something more than casual interest. He spoke with high authority and the things he said made sense. American public opinion would be strongly against foreign control, direct or indirect, of our wireless facilities. Congress and government

officials would be swayed by this trend of thought. General Electric agreed to go along. They would pass up the proffered business from the Marconi interests with the idea of building up an American customer of equal or even greater potential. Accordingly, under the leadership of Owen D. Young plans were made to carry out Admiral Bullard's idea and attempt the formation of a new American company which, through domination of the industry at home, would have the power and prestige to succeed on the international scene. Basic to the plan was the realization that the new enterprise must undertake to carry forward over the years a highly organized and aggressive program of research and experiment.

Young and his associates conceived boldly. It was decided that the first step would be the acquisition of the American Marconi Company. In this they succeeded. The General Electric Company by September, 1919, had purchased the shares held by British Marconi and concluded arrangements by which American Marconi would turn over its assets to the proposed new American concern. Accordingly in October and November of 1919 officials of the General Electric Company caused the incorporation of the Radio Corporation of America—RCA. With the assets, personnel, and technical know-how of American Marconi, it had every prospect for success. The capital of the new company was set at a high level. It was to consist of 5 million shares of \$5 par preferred stock and 5 million of no-par common. Owen D. Young became chairman of the board; Edward J. Nally, former vice-president of American Marconi, assumed the position of president; and David Sarnoff was made commercial manager.

An unusual feature of this new company was its relation to the federal government. The President of the United States was asked to name a representative to maintain formal liaison with RCA. In January, 1920, President Wilson approved the following recommendation from the Navy Department:

It is recommended that Rear Admiral W. H. G. Bullard be appointed by the President to attend the stockholders' meetings and directors' meetings of the Radio Corporation of America, as requested by them, in order that he may present and discuss informally the Government's views and interests concerning matters pertaining to radio communication coming before the directors and stockholders of said corporation.^a

Promising as were the auguries for RCA, events transpired in the year 1920 to show that rain continued to fall on the unjust as well as on the just. The business of radio broadcasting was born and to various other interests went the honors for its inception. Like previous scientific develop-

ments, that of transmitting voice and music through the ether sprang from a vineyard in which there were many workmen. Seemingly the minds of various scientists had responded to a common tuning.

Without attempting to assign priority of conception or appraise contributions to the art, certain events should be noted. As early as the spring of 1920 engineers in the American Telephone and Telegraph Company, working to perfect radio telephone equipment, were projecting over the air short talks and musical selections from phonograph records. These went out from experimental stations in New York City and from New Jersey. They were avidly picked up by amateur wireless operators in that general vicinity. Similarly during this eventful year, the *Detroit News* began putting on the air "concerts" of phonograph music from its amateur station, the immediate progenitor of WWJ.

The City of Pittsburgh, however, witnessed perhaps the most significant of these events. There, the Westinghouse Electric and Manufacturing Company, which had not been originally included in the RCA setup, was directing the attention of its engineers to problems in the field of radio. Dr. Frank Conrad had been assigned to experimental work on wireless telephone transmitters.

In order to test his various instruments, Dr. Conrad devised the plan of sending radio phone messages between the Westinghouse plant and his home workshop, several miles away. Amateur wireless experimenters, or "hams," in and around Pittsburgh picked Dr. Conrad's messages out of the ether. They soon began to listen in regularly on his experiments.

Almost before he realized it Dr. Conrad and his two sons were embarked on an adventure in radio broadcasting. To satisfy their rapidly growing crop of fans who were jerry-building little radio sets, it was arranged that every Wednesday and Saturday evening a regular program would be put on to include comments, sports news, music by local talent, and phonograph records. The merchant who supplied the latter asked that his name be mentioned. His sales almost immediately began to reflect this advertisement. And so, at the crude little amateur station of 8XK in Pittsburgh during 1920, was a start made in the business of radio broadcasting.

As the new idea caught the imagination of young amateurs, a large department store in that city announced that it was offering radio receiving sets for listening to the Conrad programs. The spark thus fired met receptive response in the minds of Harry P. Davis and others of the Westinghouse staff. They began to realize that the harnessing of radio waves opened vistas other than those of the telegraph and telephone. Unlike any other method of distant communication, the radio offered a

means of conveying the spoken word and varied entertainment simultaneously to huge masses of people. Gropingly, hesitantly, their thoughts began to measure the possibilities of the new field.

To test its potentials they decided to install a more powerful, workman-like transmitting station. Thus in October, 1920, was inaugurated a broadcasting facility later to be known and enjoyed by thousands of early radio fans—KDKA of Westinghouse at Pittsburgh. Coloring this event with dramatic emphasis, the new station broadcast the Harding-Cox election returns of 1920 to avid listeners in and around Pittsburgh. Word spread across the nation of these striking accomplishments, as well as of some by other experimenters. Soon small broadcasting stations were sprouting overnight like mushrooms in various cities of the country. A growing multitude of ecstatic radio fans began listening in on crude little receiving sets.

From these small beginnings there grew within the next few years one of the great forces of the twentieth century—that of radio broadcasting. Even to the knowing, it was unforeseen and unexpected. The advent of the motor car and the movies had been slow in comparison. It opened undreamed-of horizons in the field of communications, bringing in at the same time a great new manufacturing industry. Its social and political impact has been felt by everyone, with an effect the significance of which is yet to be measured. For the spoken word and musical note, space had been annihilated.

XXXVIII.

RADIO

Part Two: Toward One World

As the success of station KDKA at Pittsburgh burst like a star shell to signal the debut of broadcasting, our radio interests were caught somewhat aback. In spite of the existence of the Radio Corporation as a unifying force, the problem of confused patent rights remained. American inventors had been both numerous and prolific. Excellent scientific advances had been made but no one person or group controlled enough patents to assure practical clearance either in manufacturing equipment or in carrying on the business of broadcasting.

Once again spurred on by promptings from the Navy Department, the leaders of the radio industry took an important step in organizing among themselves. This involved the execution of contracts later to attract much attention and engender bitter controversy—the famous cross-licensing agreements. These provided for multilateral exchange of patent rights, technical information, and research results, all to continue over a period of years. The parties were the Radio Corporation (RCA), General Electric, American Telephone and Telegraph, Western Electric, Westinghouse, United Fruit, and Federal Telegraph.

The intent was that the patent resources of the group were to be available to each of the principals, but limited to uses within their respective normal spheres of business operation. Such areas of permitted activity were not definitely spelled out but were stated in broad terms. General Electric and Westinghouse were to enjoy licenses to manufacture certain wireless telegraph equipment, broadcasting receiving sets, vacuum tubes, and amateur equipment. The selling of much of this was to be in the hands of RCA. Any of these three was privileged to set up and operate its own broadcasting stations. The Telephone Company (including Western Electric) had the right to manufacture, sell, or use certain equip-

ment for wire telephones or radio phones as well as for telegraph. Important in this connection was the radio phone or broadcasting transmitter.

To activate further the principle of cooperation and common interest, the parties to the cross-licensing contracts held stock in the Radio Corporation. In 1922 the voting power was distributed as follows: General Electric 25.7 per cent; Westinghouse 20.8 per cent; the Telephone Company 4.1 per cent; and United Fruit 3.7 per cent.

This broad alignment of interest between these great corporations, all pioneers in radio, must have seemed to them something akin to the timely demise of a rich uncle. The field of radio promised a glowing future. By this deal each could drive forward in its particular orbit backed by the common pool of patents and research work. Moreover, in a sense, the whole arrangement enjoyed the blessing of the Federal Government through the active support of the Navy Department.

Scarcely, however, had the ink dried on these contracts when the participants found themselves caught up in an onrush of developments which put severe strain on the initial harmony. That strange, quite unexpected newcomer, radio broadcasting, had set fire to public imagination. Such was the interest aroused by the Westinghouse station KDKA at Pittsburgh that the company promptly put on the air station WBZ at Springfield, Massachusetts, and station WJZ at Newark, New Jersey. These headed a veritable flood. By the beginning of 1922 the radio fever was sweeping the country. New broadcasting stations were being launched almost daily. In February some twenty-four were started and in May ninety-seven were licensed. On August 16 the American Telephone and Telegraph Company launched station WEAJ. From the very outset it was distinguished for high technical performance and programs of quality. That year was one of continued hectic activity. By December the country, for better or worse, possessed a total of 576 licensed broadcasting stations. Home receiving sets were being sold nationally and it is estimated that in 1922 our people purchased upwards of \$60 million of radio equipment. The broadcasting boom was under way.

Nothing even remotely resembling this had been contemplated when the patents pool was formed. The dog was being wagged by the tail. Broadcasting had been unpredicted and was proving unpredictable. The cross-licensing contracts did not provide for the contingencies which now began to arise and for the conflict of interests inherent in the situation. Henceforth these agreements were to be subjected to growing strains, finally to reach destructive proportions.

On the wider scene broadcasting brought in novel and to some extent

quite baffling problems. Reception of programs was bedeviled with interference. Early operators paid scant regard to the assignment of wavelengths. Some of the pioneer stations felt that they had acquired preemptive rights to certain wave bands. Ship-to-shore wireless telegraph with its high-powered spark would break into programs. Added to these complications was the fact that many of the crude receiving sets could not be tuned with effective selectivity. All in all a high state of confusion prevailed. Secretary of Commerce Herbert Hoover, under whom the licensing of stations was placed, did his best to resolve these difficulties. Obviously the situation called for a strict regulation of the use of broadcasting wave bands. Congress, however, was reluctant to embark on these unknown seas and left Hoover to improvise under ineffective statutory authority.

Another problem of this new industry presented even fewer aspects of familiarity. Who was going to pay for the year-in year-out cost of operating these broadcasting, or as some called them "radio telephone," stations? The idea of selling advertising time had not as yet taken hold. Meanwhile the stampede of people who for one reason or another wished to own a broadcasting station continued. These included manufacturers, newspapers, department stores, amateur scientists, educational institutions, and a host of adventurers who were just surf-riding the crest of the new idea.

As sellers of transmitting equipment, the Telephone Company became concerned with the rapid pace of the development before a sound basis had been worked out for paying expenses. In a bulletin issued by Western Electric, attention was directed to the fact that while a broadcasting station could be installed for somewhere between \$10,000 and \$15,000, the purchaser would face annual operating charges of at least 100 to 200 per cent of those figures.

To discover some way of meeting these costs became a matter of concern. The problem was novel in its basic aspects. The consumer, or ultimate beneficiary, was anonymous. Once on the air, a broadcast program could be picked up by anyone. Accordingly we find groping and hesitant consideration being given to a whole gamut of proposals for a means of meeting operating expenses.

Some persons felt that stations should be endowed. Many attempts were made to finance broadcasting by means of local contributions. The foreign concept of a tax on receiving sets was strongly urged. Another favored plan was for the expense of broadcasting to be borne by manufacturers of equipment. At this time there was no such thing as a broadcasting station making money. They were in the red because they

had no regular income. The only way their continuance could be justified was by some collateral advantage such as the advertising value that accrued to concerns like newspapers or department stores. As the exuberant promoters of stations awakened to these hard facts, a great folding-up occurred. Throughout 1923 and 1924 many stations were closed down

Via WEA F Monday Aug 28 Clear 95°
 Condenser Trans. 600 λ watch.

4.30p Started OK	WSE - NAW
4.37	NAH - KUQL
4.40	WCG - KOLC
4.47	NAH - KDOZ
4.50	NAH - NALS
4.52	WNY - MX
4.57	WNY - MX
5.00	

500/500 Quersbars Carpen
 "Our first customer."
 WNY & WSIA

5.12

5.20 600 λ just.
 5.25 Test 600 λ

5.27. Beginning off Gr.

Done. Trans OK today

Facsimile of page in log book recording the first commercial broadcast, that by WEA F on August 28, 1922

Courtesy of the Radio Corporation of America

each month. In June of 1924 some 81 went out as compared to 27 new ones that were licensed. The turnover was high. The problem of how to finance broadcasting had members of the industry baffled and public opinion confused.

Even as people debated these things the solution had already been found. It came about more or less under its own impetus and crept up on the blind side of the industry. In making plans to develop this new field it was quite natural for the Telephone Company to think of broad-

casting as one-way radio telephony. It was standard practice, of course, to sell time for the use of telephone wires. Why not therefore sell time for the use of broadcasting facilities? The obvious customers would be our advertisers, whose interest after all was only in one-way communication.

Accordingly radio history was made on August 28, 1922, when the Queensboro Corporation paid to go on the air over the Telephone Company's newly born station WEAf. In a short ten-minute program residents of Greater New York were urged to take up homes at Jackson Heights, Long Island. A series of these talks was credited with stimulating the sale of real estate. Shortly thereafter the Tidewater Oil Company and the American Express Company purchased radio time to experiment with this new medium. These incidents occurred without any fanfare of trumpets or flashing of northern lights. But they were significant. The way was indicated by which the new industry could sustain itself within the framework of our free enterprise system. The profit motive would be put to work through the sale of radio time.

At first this concept of selling broadcasting time for advertising purposes aroused a measurable degree of hostility. Newspapers which had been giving the new infant, radio broadcasting, a great ballyhoo now began to wonder just where all this was heading. Could it be that they had taken a viper unto their collective bosom? A writer in *Printer's Ink* stated: "Any attempt to make radio an advertising medium, in the accepted sense of the term, would, we think, prove positively offensive to great numbers of the people. The family circle is not a public place, and advertising has no business intruding there unless it is invited."¹ Similarly, the *Radio Dealer*, a trade periodical, went on record: "Every reader of this publication is urged to write his Congressman to-day demanding that stations broadcasting advertising matter be forbidden the use of the 360 wave-lengths."²

The practice of selling radio time was not immediately applied on an industry-wide basis. This was due to a number of reasons. In the first place, the Telephone Company's experiment in marketing WEAf time was no outstanding financial success. Advertisers were cold to the new idea. Then there were the limitations imposed by the patents of the Telephone Company and its rights under the cross-licensing contracts. From its "telephone" conception of broadcasting, the Telephone Company claimed the sole right of selling radio time to outside advertisers, or of licensing other stations to do so. This was a bitter pill for G. E., Westinghouse, and RCA to swallow.

Even more restrictive to the development of advertising as a source of

revenue was the fact that broadcasting was still a matter of unrelated stations each serving a local territory. Had it not been for a new technological advance progress might have been slow. Fortunately, however, the event was at hand. Network broadcasting came into being. This was the system by which long-distance telephone wires were used for carrying programs simultaneously to a group of local broadcasting stations. It found technical justification in the fact that better results were thus obtained, especially freedom from static, than where programs were thrust through the air for similar distances.

This development is considered to have had its practical start on January 4, 1923, when station WEAJ in New York was connected by long-distance telephone wires with station WNAC in Boston. A program from the WEAJ studio in New York was carried to a public address system in the Copley Plaza Hotel in Boston. In July of that year the first permanent hookup was established when a tie-in was made between WEAJ in New York and Colonel E. H. R. Green's station WMAJ at Round Hill, Massachusetts.

Some months later, in December, 1923, a landmark in radio network history was passed when President Coolidge's message to Congress was "piped" from Washington by telephone circuits and then put on the air by radio stations in New York, Providence, St. Louis, Dallas, and Kansas City, Missouri. There was a touch of humor in this because the words of the tight-lipped, monosyllabic New Englander were carried to more persons than had ever before listened to a public speaker.

These first temporary interstation hookups were in the nature of experiments. The results quickly led to broader application. By April of 1924 the Telephone Company had evolved the plan which was to provide a sound economic basis for the new broadcasting industry. A scattered group of independent local broadcasting stations would be connected to WEAJ, as a nucleus, by wire circuits which during "off-peak" hours at night would be permanently set aside for broadcasting service.

In order to provide a source of income from which to meet expenses, it was decided to follow the formula initiated by WEAJ in the first "commercial," the Queensboro program of 1922. Advertisers would be offered the opportunity of buying WEAJ time for programs which would go over the wires and be put on the air simultaneously in various parts of the country by the member stations. The increased number of persons thus reached should justify higher charges for the time sold.

WEAJ, which by this time had won a reputation for high quality broadcasting, offered local stations two basic types of programs. First were the so-called "sustaining" ones in which WEAJ provided enter-

tainment at its own expense. For these the local stations were to pay agreed-upon sums. Then there were the "sponsored" programs presented by advertisers. For broadcasting these the local station was to be paid from charges collected by WEAF. It was believed that the income from this source for the local stations would exceed their expenses under the arrangement.

At the outset it was apparently easier for WEAF to secure the support of advertisers than that of independent stations. Many of the latter were owned by newspapers and department stores for good-will purposes. They questioned whether national advertising would be detrimental to their local interests.

Nevertheless by October, 1924, the Telephone Company was ready with a small group of independent stations for a trial of their new commercial network idea. This was the beginning of the "Red Network." It then included WEAF in New York, WEEL in Boston, WGR in Buffalo, WJAR in Providence, and WCAE in Pittsburgh. The name apparently grew out of the fact that in segregating telephone circuits on their maps, the "long lines" engineers used colored crayon to indicate the lines employed in broadcasting. Hence arose names later to be recognized leaders in radio—the "Red," "Blue," and "Purple" networks.

The closing months of 1924 saw commercial broadcasting fully launched and already assuming the pattern by which we know it today. Operation of this pioneer WEAF network of from six to thirteen stations began at once to indicate the extraordinary power of this new advertising medium. One early concert of good music by famous artists brought forth about 60,000 letters of appreciation. Accordingly some of our large corporations initiated sponsored programs which attracted wide attention. Among these were the Eveready Hour, the A & P Gypsies, the Gold Dust Twins, and the Goodrich Silver Town Orchestra.

While network broadcasting placed the new industry on the high road to prosperity, it served to spread neither content nor sweetness and light among the parties to the cross-licensing agreements. The booming, unpredictable broadcasting business was subjecting these contracts to disrupting stresses. The Telephone Company and Western Electric were pulling one way. General Electric, Westinghouse, and the Radio Corporation were straining in another.

The issues were sharply drawn. The A. T. & T., and its manufacturing subsidiary, Western Electric, sought freedom to produce and sell receiving sets and vacuum tubes, a right which the others claimed exclusively under the contracts. On the other side, G. E., Westinghouse and RCA, with some fourteen radio stations on their hands and no means of making

them self-supporting, believed they should be allowed to sell broadcasting time, a prerogative which the Telephone Company took unto itself and its licensees.

Repeated efforts to resolve these difficulties by negotiation failed, even though the corporate officials involved were men of broad experience. Recognizing that a prolongation of the impasse would work to no one's benefit, they adopted a common-sense method of resolving their difficulties. They agreed to submit the issues to arbitration and accept the resulting decrees as final.

This was one of the most important cases ever handled under such procedure. Roland W. Boyden of Boston was chosen as referee. Resolution of the issues took almost three years and it was not until July, 1926, that eleven different contracts and letters were signed to carry out the decisions which had been reached.

Under the settlement, the Telephone Company and Western Electric were accorded the right to manufacture a limited, specified number of receiving sets each year free from royalty payments. This was for the purpose of permitting the engineers of these companies to keep pace with the development of the science.

Solution of the problem of relative participation in the field of broadcasting brought forth a plan of unique interest. During the final months of negotiating the all-round settlement, David Sarnoff of RCA and his associates proposed the formation of a new company to consolidate a number of broadcasting stations, principal among which would be WEAf and WJZ. In this way it was believed that a more comprehensive service of high-quality programs could be offered through local stations to an increasingly enthusiastic public. The idea met with favor. The plan formed part of the final settlement and the great broadcasting controversy was settled by a contract on the part of the Telephone Company to sell its prized station WEAf to RCA for \$1 million. Thus the Telephone Company got out of the broadcasting business which they had come to regard as alien to their basic purpose of providing telephone service. No longer would there be any question of the rights of the other parties to sell broadcasting time. Furthermore, it was agreed that the Telephone Company would lease its long lines to RCA stations for network hookups.

To implement these plans the RCA group organized the National Broadcasting Company, Inc., which received its charter on September 9, 1926. Shortly thereafter the new company set about expanding two radio networks—the Red around WEAf and the Blue around WJZ.

Rarely had a new business enterprise been launched with such im-

pressive sponsorship as NBC received. Representatives of RCA, General Electric, and Westinghouse were on its board of directors. In addition it was provided with an advisory committee that included Dwight Morrow, Charles E. Hughes, Elihu Root, and Walter Damrosch.

The project was so ambitious and so much in the public eye that its sponsors were somewhat awed and self-conscious. At this time (1926-1927) it looked as though the NBC networks would have such preeminence that they would constitute a virtual monopoly in network broadcasting.

Any worries on that score did not last long. The free enterprise system has about as much regard for monopolistic conditions as nature has for a vacuum. Shortly there arose an independent concern which within a few years would let NBC understand that there was competition about. The Columbia Broadcasting System came into being.

It seems that down in Philadelphia, during 1927, a young man had been left in charge of a branch cigar factory by his elders who were vacationing in Europe. In their absence the inexperienced youth, no doubt bored by the staid orthodoxy of the family business, decided that it needed a bit of jazzing up. Accordingly he contracted for a short broadcasting program plugging cigar sales over a local station, one of the units of a struggling network promotion which was almost going down for the third time.

When the knowing ones returned from Europe, they were shocked at the young man's lack of acumen. The radio contract was canceled forthwith. Then an extraordinary thing happened.irate listeners wrote in protesting the termination of the radio program. Evidently it had a host of followers. This new amusement device, crude as it was, had captured public interest. Quickly the oldsters reversed themselves and the youth was given a green light on radio advertising. He had the courage of his convictions and contracted for a series of broadcasts at \$4,000 per week. Their success was phenomenal. Cigar sales mounted rapidly. Shortly thereafter radio history was made when he purchased control of the rickety little network which could perform such wonders. His name was William S. Paley. The network became the Columbia Broadcasting System, Inc.

Paley was a good businessman. His ship caught a fair tide. In 1930, two years after he assumed its management, Columbia did a gross of \$8,726,884 and made a net profit of \$874,715. The following year its profits of \$2,346,766 slightly exceeded those turned in by NBC. Thus within a short time of its spectacular launching in 1926 as the favored child of big business, NBC found itself faced with a strong competitor which, so to speak, had come up from the ranks. This was salutary. While there was

no reason to believe that NBC had any ambition toward monopoly, the very reasons which prompted its formation gave it a dangerous pre-eminence.

It must at the same time be recognized that the broadcasting business was inherently one of small enterprise. While we have thus far observed the formation of the early large networks, its real structure was provided by the existence of a multitude of local broadcasting stations. In June, 1925, some 571 of these were scattered throughout the country. As time went on, we note tendencies to organize along both territorial and national lines. In New England the Yankee Network was built up by John Shepard III around station WNAC in Boston.

Later several of the most important independent local stations got together to organize a new national network to operate on a cooperative basis. Thus in 1934 the Mutual Broadcasting System was formed by WOR of Newark, WGN of Chicago, WLW of Cincinnati, and WXYZ of Detroit. This plan worked out successfully.

Similarly in the field of manufacturing it was relatively easy for companies to get started. Any intelligent young mechanic could readily learn to put together a receiving set. Before long we note the rise of some of these small concerns to sufficient size and strength to challenge the old-timers—RCA, G.E., and Westinghouse. These independent producers offered real competition. They kept close to their markets and could quickly adjust their products to changes in the science or in the tastes of their customers. Prominent among them were Atwater Kent, Crosley, Philco, Zenith, and Stromberg-Carlson.

While the growth of the broadcasting business was phenomenally rapid, its economic position remained sound. With an entertainment aspect of widespread appeal and the ability to project the advertiser's message directly into the family circle, it was well suited to the American scheme. It helped greatly in selling more goods to more people.

This inherent strength was shown by the fact that during the depression years of the 1930's the broadcasting business held up remarkably well. Even in the worst times many manufacturers found it profitable to continue their sponsored advertising programs. In each year of the great depression both NBC and Columbia reported a profit. Gross receipts continued to grow in all but one of these years.

This period was significant for another event. In spite of the fact that many little companies comprised the basic fabric of the broadcasting business, the Department of Justice was perturbed about the power of the large concerns, especially RCA, G.E., and Westinghouse. Whether guilty or not they were finally charged with violating our anti-trust

statutes. To settle the matter a consent decree was entered in November of 1928.

Under its terms, G.E. and Westinghouse engaged to divest themselves of ownership of RCA stock and to remove their representatives from its board of directors. Complicated agreements were drawn in regard to patent licenses, manufacturing rights, and broadcasting. The net result was to make RCA independent of G.E. and Westinghouse. Each of the three was left in a position to manufacture and sell receiving sets and tubes.

Rarely has the fate of a great corporation in America been so largely determined by the acts of the Federal Government. It was the suggestion of Admiral Bullard, acting with the blessing of President Wilson, which led to the formation of RCA by the General Electric Company back in 1919. Thirteen years later the same government through its Department of Justice insisted that parents and child be separated and that henceforth RCA stand on its own.

Having passed through the general business depression of 1929-1933 with surprising vigor, the radio industry found itself well entrenched by the late 1930's. Both manufacturers and broadcasters were doing well. Nevertheless any tendency toward complacency was restrained because technological advances kept the industry keenly alert. Television hung on the verge of wide commercial application as also did frequency modulation. During these years the minds of our scientists were magnificently fruitful. Men like Zworykin, Farnsworth, and Armstrong led the world in their revelations of scientific truth as applied to electronics.

But neither television nor frequency modulation came into their own prior to World War II. Their stories are for another telling, but in connection with the former there is one incident which perhaps should be noted. It serves to highlight in an interesting manner how legitimate governmental regulation may easily verge on paternalism.

For a time the Federal Communications Commission held back approval of commercial television on the ground that people who purchased early receiving sets might shortly find them outmoded by the rapid pace of technological advance. Meanwhile RCA was pressing to get going in a business way as the surest means to advance on both the scientific and commercial fronts. The Commission's restrictive policy was a strange philosophy to be invoked under the American way of doing things. Our success in the past has been predicated upon encouraging private initiative and restraining bureaucracy. Moreover from the public's point of view, one of the most cherished of all freedoms is that of making one's own mistakes.

Stemming from WEA's first sale of radio time for a few hundred dollars, the broadcasting business has grown so that in 1941 upwards of \$225 million were appropriated by advertising sponsors for radio programs. In 1944 the Bell System alone had set aside some 135,000 miles of wire circuits for broadcasting. There were four national and some thirty-six regional networks. It is estimated that our people were using over 55 million receiving sets.

Commercial broadcasting as thus developed was uniquely an American business. Differing from the practice followed in other large countries we had permitted the free enterprise system, under moderate regulation, to provide the means of sustaining radio. The boring moments we spend listening to advertising blurbs is the price we pay for keeping our broadcasting out of the hands of a government bureau or monopoly. This American way of a self-supporting broadcasting industry has contributed substantially to the maintenance on the air of that cherished right—freedom of speech. Ours is the only great nation today in which the government does not directly or indirectly control radio programs.

But the miracles worked by radio waves have not been confined to advances in broadcasting. Radio facilities have contributed mightily to marine and aerial navigation. The two-way radio phone, directional wireless, time and weather signals, radio beacons, radar and loran, are not only accelerating the movement of goods and passengers but are doing so with improving margins of safety. In fact so great a part are these things playing in modern sea and air transportation that one can scarcely conceive of doing business without them.

Science and manufacturing have also benefited richly. The electron microscope, devices for geophysical exploration, and machines for abstruse calculations are finding expanding employment. Similarly production methods have been effectively improved. Heat treatments for certain materials have been applied and regulated. Machine tools are put under the most precise automatic controls. The accurate grading of many factory products is accomplished through use of the photoelectric cell.

Widespread and significant as are these achievements, they all stem from a common line of inheritance—the concepts and discoveries of Maxwell, Hertz, Marconi, Edison, Fleming, de Forest, Arnold, Langmuir, and others. By their efforts over a relatively short span of years a great revolution has taken place in applied science. When the thermionic vacuum tube was perfected man moved into a greater universe. Through the harnessing of the submicroscopic electron, he achieved powers which make those of the legendary geni puny in comparison.

But particularly impressive to us have been the accomplishments in

the field of communication. By them, age-old barriers of terrain and distance have been overcome. Peoples of utterly remote communities have been made neighbors of those in far-away large cities. The greater ease with which men may exchange ideas and goods serves to promote understanding and to raise standards of living. A long, forward step has been taken toward the One World concept for which the late Wendell Willkie fought and to which so many people today subscribe.

XXXIX.

AVIATION

Part One: From Kittyhawk to Airplane Boom

FOR some months previous to December, 1903, our newspapers and magazines had been playing up the forthcoming trial of a "flying machine" which a venerable scientist was building in Washington. The inventor, Samuel Pierpont Langley, was putting the final touches to his "aerodrome," a tandem monoplane designed to carry only a pilot. Built with a Congressional appropriation of \$50,000, it was powered with an advanced type of five-cylinder radial gasoline motor.

The plane was to be launched by catapult from a short runway on the top deck of a large houseboat anchored in the Potomac. An accident in launching having defeated the first trial in October, Langley and his assistant, Charles E. Manly, were ready on December the 8th to demonstrate what they hoped would be man's first sustained flight in a power-driven plane.

When the plane was finally ready, Manly seated himself in the cockpit at the crude controls. Langley, a distinguished-looking white haired figure, stood alongside. All that a man can give of himself he had put into this project. He had dreamed, studied, calculated, and experimented. The "aerodrome," his brain child, was a scientist's effort to fulfill man's age-old dream of conquest of the air.

The catapult controls were released. But before the plane had even cleared the deck misfortune struck for the second time. A tail surface caught on the launching way and the plane nosed up into the air at a stalling angle. With Manly struggling desperately at the controls, it crashed into the Potomac. The pilot was unhurt but the machine was wrecked. Langley was stunned.

The press which had outdone itself in colorful anticipation now turned

on the inventor and his device. It was categorically asserted that man-made flight was impossible; that this had been realized all along; that Langley's project was sheer hocus-pocus. Scarcely had these ideas been formed when, on December 17, 1903, a bare nine days after the Langley disaster, the miracle was worked. On the lonely sand dunes of Kittyhawk, North Carolina, man flew in power-sustained flight.

When the Wright brothers telegraphed word of their great triumph for release in the Dayton papers, the news was greeted with something less than acute interest. It is reported that one local editor yawned and without looking up at Lorin Wright, a brother of the fliers, remarked: "Fifty seven seconds, hey? If it had been fifty seven minutes then it might have been a news item."¹

The story of the Wright brothers is a modern saga. If ever there was a case of men lifting themselves by their bootstraps, this was it. Neither of them had the advantage of a scientific education, yet they were scientists in the best sense of the word. Slowly, thoroughly, and with infinite patience they garnered from textbooks and the written record all that their predecessors had learned about maintaining gliders in flight. Having absorbed this knowledge, they pressed ahead to explore on their own unmapped areas of thought. They built a small wind-tunnel, sixteen inches square in the section and six feet long. In this, with the draft from an improvised blower, they tested all kinds of wing shapes. When their data were compiled, they discovered critical errors in hitherto commonly accepted principles. Relying upon their own experiments they built and successfully flew a series of large gliders. Operational observation of these confirmed their theories and enlarged their understanding of the problems involved in the flight of heavier-than-air machines.

They worked carefully and painstakingly from one problem to the next, like a mountaineer ascending an escarpment. Finally they made their great discovery—the warping or twisting of the ends of the wings gave an effective control of lateral balance. They had advanced the knowledge of aerodynamics as Columbus had that of terrestrial geography.

After the first short flights at Kittyhawk further experimental work was carried on through 1904–1905 at a field on the Huffman farm just east of Dayton. Progress was slow. These unknown bicycle repairmen, shunning publicity, were content to proceed cautiously. They must teach themselves a skill no man had ever known before. By the fall of 1905 Wilbur had made a flight of 24½ miles in 38 minutes and 3 seconds.

Having secured their basic patent on the wing-warping control principle and further improved their experimental planes, the Wright brothers faced the problem of finding customers for their product. How did one

sell flying machines to a public that persisted in the belief that men could not fly? It occurred to them that the aeroplane might have military uses. The Wrights offered to make and sell a machine to the War Department. Its officials, however, thought they were too smart to be tricked by these upstarts. If Langley, the well-known scientist, could not build an aeroplane, how could these supposedly unlearned mechanics? Against the active interposition of William Howard Taft, then Secretary of War, Senator Henry Cabot Lodge and Herbert Parsons, the great minds of the War Department held the line. In a manner reminiscent of Custer's Last Stand, they persisted in their refusal to purchase a Wright plane.

In the meantime the two Dayton prophets were being accorded recognition away from home. Both the British and French governments showed keen interest. In order to develop prospects for business in Europe, the Wrights entered into a deal with the well-known American promoter, Charles R. Flint, who, with an associate abroad, Hart O. Berg, undertook to exploit the European market.

In the closing weeks of 1906, almost three years to a day after the first flight at Kittyhawk, the *Scientific American* came out to acknowledge the epoch-making quality of the Wright discoveries. Following this, officials in the War Department began to sense that something was really going on in the field of aeronautics. In December, 1907, they advertised for bids on a trial machine for Army use and received something like forty-one proposals. The Wright offer was accepted. The contract contained a provision that 10 per cent of the purchase price was to be deducted for each mile of speed by which the plane's performance fell below 40 miles per hour. Early in September, 1908, Orville Wright made successful short test flights at Fort Meyer, Virginia, before small but enthusiastic crowds. Now the general press and its readers woke up. The two small-time bicycle repairmen did have a flying machine! Man had conquered the air!

While the Wrights were pushing painstakingly ahead other men had been grappling with this problem of power-sustained flight. In France several had actually flown. In the United States Alexander Graham Bell had organized the Aerial Experiment Association in 1907.

Among those working in this Bell group was a young man destined to share leadership with the Wrights in the early days of American aviation. Glenn Curtiss had built and raced motorcycles. When the Wrights and pilots in France began taking up their crude, flimsy planes, Curtiss sensed an opportunity to make use of his knowledge in constructing light motors. Accordingly, at Hammondsport, Curtiss built the "June Bug," a

small biplane in which on July 4th, 1908, he flew a distance of some 2,000 yards. Other and better planes followed and shortly we find Curtiss winning air races and gaining considerable fame both for building and racing planes.

Considerable rivalry developed between the Wrights and Curtiss. This became quite bitter when in 1910 the Wrights brought suit against Curtiss in this country and against others in France for patent infringement. Curtiss was using ailerons for control of lateral balance in place of wing warping. The Wrights maintained that their original claims were sufficiently comprehensive to cover the Curtiss device. For the next few years the controversy raged until in January of 1914 it was settled in the Wrights' favor by a decision in the United States Circuit Court of Appeals. Commenting on this, Lieutenant Baldwin, an early flying enthusiast, remarked: "It is high time for all the rest of us to step up and admit that not one of us ever would have got off the ground in flight if the Wrights had not unlocked the secret for us."² Favorable decisions were also obtained in Germany and France.

Meanwhile the science of flying planes was advancing rapidly. The Wrights were taking their fragile-looking, pusher-type biplanes for higher and longer flights. In 1908, while Orville was continuing his demonstrations for the War Department, Wilbur went to France and in August made his first flight in that country near LeMans. He created a sensation. The French took Wilbur to their hearts and acclaimed him as the man who had conquered the air. Immediately France set to work to develop some flyers of her own. In July, 1909, Bleriot established one of the landmarks in aviation when he flew across the English Channel to land on the cliffs of Dover. Public interest both here and in Europe was becoming aroused about flying.

In such an atmosphere it was quite natural that various people should begin to think of means for extracting profit from this new development. Among them was a young man whose imagination was equalled only by his self-assurance. Clinton R. Peterkin, who had once been an office boy in the staid chambers of J. P. Morgan & Company, called on Wilbur Wright at the Park Avenue Hotel in New York City. The youthful Peterkin explained that he would like to promote a company of large capital to exploit the Wright aeroplane. Something worked the needed magic because shortly thereafter we find Peterkin and De Lancey Nicoll, a well-known lawyer, engaged in organizing such an enterprise. In November, 1909, The Wright Company was incorporated with a paid-in capital of \$200,000. It acquired the Wright patents, paying partly in cash and partly in stock and further agreed to pay the Wrights a 10 per cent royalty on all planes which

it might sell. The original stockholders list comprised, besides the Wrights, names famous in business circles such as, Cornelius Vanderbilt, Howard Gould, August Belmont, and E. J. Berwind. As a promoter the 24-year-old Peterkin was doing all right.

By November of 1910 The Wright Company had built its own small factory and was turning out two planes a month. The question was how to sell them. Obviously it was too early for private flying. Airplane transportation seemed a long way off. With an aroused popular interest exhibition flying seemed the line of least commercial resistance. The Wright Exhibition Company was formed. A daring young man who had been risking his neck and thrilling crowds by flying a small and unpredictable dirigible was engaged as manager. This was Roy Knabenshue who became one of the most famous of the early flyers.

Both this company and Glenn Curtiss established flying schools to train men for exhibition work. These attracted many adventurous youths who after a few hours of instruction learned to fly "by the seat of their pants." Soon no county fair or convention was complete without an air show. The flyers traveled from place to place as teams and engaged in all sorts of flying stunts. Lincoln Beachey had a special hair-raising trick of scooping a handkerchief from the field with a wing tip. Thus the first phase of the aviation industry was show business. It was the only means by which planes could be turned to profit. It also served another purpose. Many of the spectators at these little exhibitions demanded to be taken for short flights. Our people were becoming air-minded.

As a result, 1910-1911 produced quite a blooming crop of little airplane promotions. Month after month projects for manufacturing, training, or exhibition were launched by enthusiastic sponsors. Flying schools were started by men who had never flown a plane. Many of these projects were simply get-rich-quick stock schemes to lure small-time investors into parting with their money.

But in the field of legitimate operation, several isolated events were casting shadows of things to come. They serve to show how pitifully small were the beginnings in aviation. Late in 1910 P. O. Parmelee in a Wright biplane carried a consignment of ten bolts of silk from a point near Dayton to Columbus, Ohio. This was apparently the first air-express trip. In connection with an aviation meet in 1911, Earle L. Ovington flew mail for a few days from Nassau Boulevard to Garden City Estates, adjacent communities on Long Island. This first air-mail jump was a scant ten miles but it claimed considerable attention because it was officially recognized by the Post Office Department. In 1914 an abortive attempt was made to establish a commercial air line in Florida, the St. Petersburg-Tampa Airboat

Line attempted scheduled passenger service between those cities. But all in all, right up to the outbreak of World War I, the aviation industry was a gawky fledgling sticking close to the nests of the original inventors.

While previous to our own entrance into the war we had received some orders for aircraft from the Allies, the real impact upon our manufacturers did not come until we started to build and train an army. Then under the pressure of military necessities we attempted a program of extraordinary proportions. Seldom, if ever, have production schedules been so ambitiously magnified. "An industry that was less important financially than the toy-balloon business was suddenly ordered to produce 29,000 airplanes, although it had not yet produced 200 since the first flight in 1903."³ Total wartime appropriations for aircraft and training were about \$1,250,000,000.

Progress toward our goals was not smooth and at times considerable criticism was aimed at both government and manufacturers. There was much milling about and lost motion. The great difficulty was that we were attempting to bring into being an industry overnight. In the light of war-time needs we had, practically speaking, no aircraft productive capacity or experience in its quantity production. We turned to the automobile industry to make good these deficiencies. Howard Coffin of the Hudson Motor Car Company became Chairman of the Aircraft Production Board. John N. Willys took charge of production at the Curtiss Aeroplane and Motor Corporation. Other prominent motor car interests became identified with the Dayton-Wright Aeroplane Company and the Wright-Martin Aircraft Company.

These men faced new problems; their solution took time. The war ended before planes of American design and manufacture reached the combat front. American pilots fought with French and English machines. Nevertheless our accomplishments were substantial. When the Armistice came our aircraft industry was beginning to get into its stride with a potential output of 17,000 planes per year. Furthermore, we had designed and brought into production an excellent airplane motor—the Liberty 12. For several years to come it rendered yeoman service both in military and air mail services. More important for the future of aviation was the fact that we trained thousands of pilots and mechanics who during postwar years were to spread the ferment of air-mindedness.

The most significant aviation event of the war period, however, was one of a nonmilitary character. On May 15, 1918, President Wilson and members of his cabinet assembled at an airfield near Washington, D. C. to watch Lieutenant George Boyle take off in a small open-cockpit plane. As the dignitaries waited in solemn expectancy, considerable to-do went on about getting the plane's motor started. Suddenly someone bethought him-

self to check the gas tank. It was empty. Finally all was set, Lieutenant Boyle took the air and flattened out on a course for New York City. This was the beginning of regular air-mail service in America.

The inauguration of this service between New York and Washington, D. C. was due largely to the imagination and initiative of officials in the Post Office Department. In spite of military exigencies they were able to secure a few small planes and to wheedle the War Department into using the mail route for training army aviators. The Army retained control for three months but on August 10, 1918, the Post Office Department took over. The amount of business was disappointing. Air mail did not save much time and postage rates were high. The impressive thing was that both Army and Post Office pilots maintained scheduled flights with a high degree of regularity.

From this point on we find the Post Office Department playing a vital role in the development of aviation. Eventually it turned the mail routes over to private business concerns and mail-carrying contracts provided the first important source of income for the new industry. In turn these revenues enabled the companies to expand into the transportation of passengers and express.

The very nature of this new industry called for a close tie with the Federal Government. The Post Office Department had an interest in promoting facilities which gave promise of faster mail service. Flying the airways was a use of the public domain. It was almost wholly interstate commerce. Problems of safety were highly complex and necessitated extraordinary measures to ensure reliable equipment and careful operation. That this industry should develop under the protective wing of government is not to be wondered at. The remarkable thing is that, unlike other countries, we were able to find a way of fitting the development into the free enterprise system. Ours was a solution characteristically American. That we have come to lead the world in aviation is due in no small degree to the fact that we insisted upon retaining the profit motive in this industry under a program of government regulation.

Immediately after the end of World War I there was a burst of enthusiasm in civil aviation. The science of flying had been advanced by military operation and the aeroplane had become a more dependable means of travel. In 1919 Captain John Alcock, a Canadian, and Lieutenant Arthur W. Brown, an American, made the first nonstop trans-Atlantic flight. They flew from St. Johns, Newfoundland, to Clifden, Ireland, in 15 hours and 57 minutes. Edward Hubbard established a private company to carry mail between Seattle and Victoria, B. C. He used planes built by

a man later to become a leader in the industry, William E. Boeing. Innumerable taxi services were started using surplus army planes.

During 1919 several companies attempted regular passenger service. Aero Limited flew between New York and Atlantic City and in winter transferred its operations to the Miami-Nassau run. Aeromarine West Indies Airways, Inc. not only flew passengers between Key West and Havana but had an air-mail contract as well. On the Pacific Coast the Champlain-Curtiss Aircraft Corporation carried passengers between San Pedro and Catalina Islands.

For the next few years there was a great deal of milling around in an effort to find ways of making money out of the airplane. Many of the early enthusiasts became disillusioned. With the planes of that day, carrying passengers was a losing venture except in rare instances. Meanwhile the Post Office Department continued to press ahead and expand the air-mail service which it still operated. Mail was flown from New York to Chicago and finally to San Francisco. At first this was done only by daylight. Then, in 1921, the Department took the forward step of trying out night flying of the mails. This called for high skill and courage on the part of the air-mail pilots who flew with no beacon lights and with only scattered airports. But this experiment served to drive home two important lessons. Air mail would never be really successful until night flying was an established practice. Night flying would not be dependable until pilots were provided with navigational landmarks. Accordingly a program was launched to mark air-mail routes at frequent intervals with flashing beacon lights. More landing fields were started and dangerous obstructions near them marked by red lights. With these developments the struggling aviation business was ready for a new lease on life.

It was not long in coming. Congress passed two laws which marked a new phase in commercial aviation. The Kelly Act of 1925 authorized the Postmaster General to turn the flying of the mails over to business concerns by a procedure of competitive bidding for air-mail contracts. A concomitant to this was some form of federal supervision and regulation of the interstate commerce of the air. Congress enacted a constructive and forward-looking statute in the Air Commerce Act of 1926. In large measure it drew its inspiration from recommendations of the Aircraft Board, presided over by Dwight Morrow, which had been studying the broad problems of commercial aviation at President Coolidge's behest.

By this latter Act there was created within the Department of Commerce a Bureau of Aeronautics, under the direction of an Assistant Secretary of Commerce for Aeronautics. To this new administrative agency a wide range of functions was assigned. Operators were examined and licensed.

Equipment was inspected and certificates issued. Accidents were investigated. Responsibility was assumed for maintenance and improvement of navigational aids and inspection of landing fields. New and accurate air-route maps were prepared. An increasingly comprehensive weather service was maintained. William P. MacCracken was named our first Assistant Secretary of Commerce for Aeronautics.

Under the authority of the Kelly Act, Postmaster General Harry S. New began to let contracts for air routes in the fall of 1925. While the formula of competitive bidding was preserved, requirements of financial responsibility and operating experience were imposed so as to avoid handing out contracts to promoters of little air experience and doubtful resources. Among the few companies to which allocations were made in 1925 were some later to become important parts of the great transcontinental system—Colonial Air Transport, National Air Transport, and Western Air Express. By 1926 twelve routes had been let. Names of well-known business men and future leaders in aviation began to appear among the officials of these companies. In Colonial we find Sherman M. Fairchild, Juan T. Trippe, William A. Rockefeller, and Cornelius Vanderbilt Whitney. In National Air Transport there were Howard E. Coffin, C. M. Keys, Philip Wrigley, Lester Armour, C. F. Kettering, and Jeremiah Milbank. Western Air Express was backed by Harry Chandler of the *Los Angeles Times*. Thus as part of the new era inaugurated by the legislation of 1925 and 1926, sources of large capital became available for the first time to the air transport business.

Perhaps the one whose participation in the growing aircraft industry caused the most comment at the time was Henry Ford. In 1923 he had been induced by his son Edsel to assist in financing William Bushnell Stout, a brilliant engineer who had some revolutionary ideas about airship design. Stout had original thoughts not only in the field of engineering but in that of money raising as well. He had written to a number of capitalists asking for funds to cover his experimental work saying: "I should like a thousand dollars—and I can only promise you one thing; you'll never see it again." Stout got the money. Shortly afterwards the Fords took over the Stout enterprise and began to manufacture one of the great ships of these early years—the Ford Tri-Motor all-metal plane.

From 1927 to 1929 this fledgling industry experienced quite a boom. It rode the crest of the general wave of business optimism and stock-market activity. The powder train for the aviation boom was fired by a modest, unassuming young man who would probably rather have cut off an arm than contributed anything of an inflationary nature to his beloved flying. When Lindbergh set the *Spirit of St. Louis* down at Le Bourget Airport,

just outside of Paris, in May of 1927, the world took him to its heart. The great Lindbergh flight was interpreted as signaling the arrival in full glory of the new age of aerial transportation. Enthusiasts could already see huge air liners streaking across the skies and small foolproof planes challenging the automobile in popularity.

This hectic optimism spread rapidly. Many small aviation projects were started with local capital. Then the leaders of the industry began to think expansively. In 1928 William E. Boeing and Frederick B. Rentschler worked out a consolidation of air lines and manufacturing companies to form United Aircraft & Transport Corporation. Its planes flew on the Pacific Coast and across the country from San Francisco to Chicago. Boeing planes, Pratt & Whitney motors, and Hamilton propellers were manufactured.

C. M. Keys and Richard F. Hoyt formed the Curtiss-Wright Corporation which acquired numerous small companies. Finally the fever spread to Wall Street. Here the public interest in aviation was exploited to form large accumulations of capital for investment in the field of aviation. In late 1928 Blair & Co., Inc. and associates launched North American Aviation, Inc. by the sale of 2 million of its shares at \$15 per share. The following March, W. A. Harriman & Co., Inc. and Lehman Brothers sold 2 million shares of The Aviation Corporation at \$20 per share to net the company approximately \$35 million. The creation of these two great holding companies marked the apex in the boom of aviation promotion. Each was shortly to wield immense power in both transportation and manufacturing.

As a result of this hectic orgy of speculation thousands of investors subsequently lost money. In the stock-market collapse of late 1929-1932 shares in many aeroplane companies sold down to small fractions of their former prices. Against these losses, in the broad balance and the long run, one must weigh the advantages to a new industry in securing generous supplies of capital which otherwise might not have been available at so early a point in its growth.

Meanwhile air-line operation was increasing. In 1928 there were 31 operators flying in the aggregate routes of 15,590 miles with some 268 aircraft in service. An important advantage accrued to the contract mail carriers in that year when Congress amended the Kelly Act to reduce air-mail postage from 10¢ per half ounce to 5¢ per ounce. The effect of the resulting increase in volume of business was to raise government payments to the carriers by about 100 percent.

The situation, however, was far from satisfactory to those whose ambition it was to build a great new transportation system. The air-mail contractors were paying little attention to the carrying of passengers. Mail

was less trouble and much more profitable. While a good many small independent lines, unable to secure air-mail contracts, were striving valiantly to build a passenger business, most of them were losing money heavily. Their principal hope was to stick it out on the chance that some way or other they would get a mail contract which would enable them to drop or minimize the passenger business. Even among the mail contractors all was not well. Being paid on a pound-mile basis those concerns operating over routes with a heavy mail load were making high profits; those flying the lean routes were losing money. Competition in bidding for postal contracts was getting keener and in some instances resulted in bids at ridiculously low figures.

Thus things stood as the Hoover administration took over in 1929. The air-transport system was ripe for better organization. Our people were thinking longingly of travel by air. The situation waited upon aggressive and knowing leadership. Fortunately this was provided by the man Hoover appointed as Postmaster General. Walter Folger Brown of Toledo, Ohio, possessed imagination, an innate sense of organization, and a courage rarely seen in public office holders. He served his country well; and he served the cause of aviation well. In doing so, he ended with a rare collection of critics and personal enemies.

When he assumed office, Brown set out to attain a thorough understanding of the problems of air transportation. He succeeded so promptly that the air-line operators were somewhat taken aback. After a study of the broader aspects of these matters, the new Postmaster General in his own mind laid down a few basic principles which were to guide his handling of air-mail contracts. The country needed an effective system of air transportation. This was required not alone for mail service but for commercial and military purposes as well. Such a system could best be secured by making the lines commercially successful and able to stand on their own feet with little or no government aid. To do this necessitated building up the air-passenger business. The existing method of handling the air-mail contracts must be revised because it was throttling the growth of passenger transportation.

In pursuance of these aims Brown succeeded in securing the passage of the McNary-Watres Act on April 29, 1930. Its declared purpose was to foster a national system of commercial aviation. To such end it authorized an increase in governmental financial aid. This was accomplished by changing the basis of compensation under air-mail contracts. The previous formula of payments based on the pound-mile of mail carried was discarded in favor of payments for the space-mile irrespective of whether

such space was actually used for mail. This assured the companies a minimum revenue which could be increased by carrying passengers.

The Postmaster General was also given broad authority to approve consolidation of operating companies, extend old routes, and create new ones. When new ones were set up, however, the air-mail contracts must be granted only after public tender and then to the lowest "responsible" bidder. On this point Congress had denied Brown's plea for the power to grant air-mail contracts by negotiation, which procedure was standard practice with the railroads. He felt that competitive bidding took from the Postmaster General essential powers of decision and injected matters of high uncertainty, and that the allotment of contracts solely upon a price factor operated against the development of an integrated national system and a well-coordinated rate structure.

XL.

AVIATION

Part Two: A National System— Wings in Wartime

THE McNary-Watres Act was in effect a new charter for commercial aviation. Postmaster General Brown lost no time in putting it to work. On May 19, 1930, he convened a meeting of airline operators in Washington at which were represented both mail carriers and those doing solely a passenger business.

Brown set forth his ideas and plans in well-defined terms. He thought there would be available something like \$20 million for payments under the air-mail contracts. In view of the many claims for participation, this sum would not suffice to give contracts to all operators. He must therefore allot contracts where they would count most in the public interest. This he understood to mean the creation of a national system of air transport as distinguished from an aggregation of local operations, many of which represented political log-rolling.

He announced that he was creating two new east-west trunk lines. One, the middle transcontinental, would run from New York to Los Angeles via Pittsburgh, St. Louis, and Kansas City. The other would operate between Atlanta and Los Angeles by way of Dallas, Fort Worth, and El Paso. These would supplement the existing northern route from New York, through Chicago, to San Francisco. The Postmaster General requested the major operators, both mail and passenger carriers, to confer among themselves and submit specific recommendations for consolidation and integration so as to get the most out of the air-mail payments in building an effective national system. He pointed out that the industry must make its plans with a view toward a gradual reduction of governmental aid.

After some weeks of discussion the operators reported to Brown that they had been unable to agree among themselves. They wanted a referee

and suggested that if the Postmaster General would decide the issues they would abide by his determination. Brown, wholly convinced of the long-range soundness of his ideas and unafraid of handling a hot potato, politically speaking, announced his decision.

Among other things he proposed that the middle transcontinental route should go to a new company to be formed by a merger of Transcontinental Air Transport, Western Air Express, and Pittsburgh Aviation Industries Corporation. The first-named was known as the "Lindbergh Line" because the famous aviator served it in an advisory capacity. It was offering a transcontinental service over the proposed route on the basis of plane-by-day, train-by-night and losing money on a magnificent scale. Western Air Express, a really outstanding operation, was flying between Los Angeles, Salt Lake City, and Kansas City and making money. The third company, although not yet operating a flying service, represented important interests in the State of Pennsylvania.

For the southern great cross-country route, Brown stated that his plan was that American Airways should be the favored child. In the case of both of these new transcontinental lines, the intention was that existing air-mail operations in the respective territories should be taken over by the large new companies.

These plans, if consummated, would bring in strong business and financial support. Back of the proposed merger (Transcontinental and Western Air) were General Motors and one of the large newly financed holding companies—North American Aviation. Behind American Airways, which was to get the southern route, was another great holding company—Aviation Corporation. United Aircraft & Transport which, through United Air Lines operated the most northerly of the three transcontinental routes, was also supported by important financial interests.

In thus favoring the large operators over the small, there was nothing sinister on Brown's part. It was his firm conviction that we would never have an effective nationwide system of air transport if we depended upon numerous small companies flying short routes. Most of them lacked the capital and management required for expansion. The railroads had found at an early date that in this country of great distances through lines were necessary for satisfactory public service. Furthermore, the Postmaster General visioned the development of giant transport planes of greatly increased air speed. This he knew would take such amounts of capital as only the strong companies could provide. Finally he wished to avoid the rapid turnover in ownership of small routes. Operators would secure a mail contract and within a few years sell out or merge with other concerns. Then they would petition for new contracts hoping to repeat the cycle. There was a

disturbing note of speculative adventure in the records of some of these small companies.

When the bids were formally opened in August, 1930, all went according to plan for the southern cross-country route. It was awarded to American Airways. Trouble cropped up in connection with the central route which under the program was to go to T. & W. A. Here an unexpected bidder appeared, offering more favorable terms. Brown ruled against the newcomer, United Avigation, on the ground that it lacked night-flying experience and was so much in the promotional stage of organization that it could not be considered a responsible bidder. After some confused negotiation T. & W. A. was designated the contract operator for the central route. The Postmaster General had succeeded with his plan of establishing three great east-west transcontinental air routes to serve as the axes on which to build the nation's air transportation system. That it was eminently practical is attested by the fact that it still prevails today, although in the meanwhile a fourth through route has been added—Northwest Airways in the extreme North. The consummation of the Postmaster General's plans, however, left some scars. It was inevitable that in this cutting up of the air-mail contract pie those operators should feel aggrieved whose expansive hopes had been denied or whose lines had been indicated for absorption by the through-route companies.

Under the new arrangement former progress carried on. In spite of the business depression beginning in 1929 growth continued in gratifying proportions, aided considerably by the reduction of postage rates already noted which had been granted in 1928. The amount of mail carried increased from 1,101,414 pounds in 1927 to 7,300,000 pounds in 1933. Most encouraging was the expansion of passenger business which grew from a total of 8,661 passengers carried in 1927 to some 493,141 in 1933. Although aggregate payments by the Post Office Department had increased materially, the amounts disbursed per plane-mile flown fell from \$1.10 in 1929 to 54 cents in 1933.

This success and a keen competitive spirit between the airlines led to important technological advances. As early as 1932 competent engineers had pointed out that what the aviation industry really needed was a plane efficiently designed for passenger transport. Tri-motored Fords and Fokkers were slow, ungainly, and costly to operate. Then suddenly within the period of a year or two signal developments took place. United Air Lines led off with the adoption of the new Boeing 247. Smarting under the impact of this move by a competitor, TWA cast about for something new of its own. At this point Donald Wills Douglas came to TWA with the design of a ship which, with its successors, was to revolutionize air trans-

port. The first DC's made their appearance. Cruising speed went up to 180 miles per hour, passenger comfort was enhanced, and costs of operation brought down. Shortly improved engine cowling, retractable landing gear, the variable pitch propeller, and the use of high-octane gas were to add to airplane performance. The industry had progressed into a new phase of operating efficiency.

Commercially and technically, the future of the air transport business looked rosy indeed. Unfortunately, however, a storm of hurricane proportions was brewing in another quarter. This disturbance was engendered in the area of the industry's relationship with government. Franklin D. Roosevelt and the New Deal had been swept into power in 1932 on a wave of popular unrest and resentment against the economic sufferings of the previous three years. James Aloysius Farley succeeded Walter Folger Brown as Postmaster General.

The new Administration considered that the people had given it a mandate of reform. High up on the list for early attention was the air transport industry. The principal point of attack was the granting of the air-mail contracts in 1930 by Postmaster General Brown. To the New Deal crusaders, this looked like the veriest work of the infidel. Republican politicians, Big Business, stock speculation, allegedly secret meetings, avoidance of competitive bidding, etc., all added up to a picture which promised the best of good hunting. Urged on by the disappointed independent operators, the zealots of the new Administration were not slow in taking to horse.

The first engagement was the investigation of the air-mail contracts by the Black Committee of the Senate. Aided by the Post Office Department, Chairman Hugo M. Black was soon making first-page headlines with sensational charges and an examination of witnesses before the Committee. He sought to show that there had been collusion in the granting of the air-mail contracts made by Postmaster General Brown in 1930. On this count Senator Black developed little that was not already public knowledge. Whether Brown had exceeded the broad authority vested in him by the Watres Act was an open question. The most damaging fact was that certain airline representatives had destroyed or refused to produce correspondence which Senator Black demanded as evidence.

Early in the year 1934 events had worked up to a climax. On February 8, Postmaster General Farley conferred with the President. The next day our people were amazed by the news that all domestic air-mail contracts had been cancelled and that the Army would carry the mails. Airline operators were stunned. While they had expected some reforms from the new Administration they had not in their wildest imaginings contemplated out-

right cancellation of all contracts. Their reaction and that of many bewildered fellow citizens was that the operators had been condemned without a hearing. Typical of this point of view was the telegram addressed to the President by Charles A. Lindbergh which read in part as follows:

The personal and business lives of American citizens have been built around the right to just trial before conviction. Your order of cancellation of all air mail contracts condemns the largest portion of our commercial aviation without just trial. . . . Americans have spent their business lives in building in this country the finest commercial air lines in the world. The United States today is far in the lead in almost every branch of commercial aviation. In America we have commercial aircraft, engines, equipment and airlines superior to those of any other country. The greatest part of this progress has been brought about through the air mail.¹

This episode now turned into stark tragedy. The Army flyers after some practice runs started carrying the mail over limited routes on February 19th. They were unprepared for the work and their Army planes ill adapted for the mail routes. Weather conditions were abominable. A series of mail plane crack-ups followed in which young Army officers went to their deaths. The nation was shocked. The Administration was nonplussed and the Army air command completely stunned. Night flying was discontinued. Even so, more Army pilots fell in fatal crashes. Finally the President wrote as follows to Secretary of War George Dern: "This action was taken on the definite assurance given me that the Army Air Corps could carry the mail. Since that time ten army fliers have lost their lives. . . . Nevertheless, the continuation of deaths in the Army Air Corps must stop."² On the order of Major General Benjamin D. Foulois, Chief of the Air Corps, the Army suspended its air-mail flights in order to reorganize its operation on a safer basis. For the first time in thirteen years the country was without an air-mail service.

It was obvious to all that the Administration had got itself into a mare's nest. The Army was not equipped to do this job. In spite of Senator Black's beating of war drums, no specific charges were drawn against the air-mail operators. Government's concern now was to find a way out. Accordingly on March 10, 1934, at the time of stopping all air-mail flying, an about-face was achieved. The President announced that the air mail would be returned to private operators.

Having secured bids in late April, Postmaster General Farley promptly began letting new contracts. Most of the former airline mail operators were restored to their previous positions under slightly changed names. For example, American Airways became American Airlines. Farley also

ruled that some companies must purge the executives who had attended meetings with former Postmaster Brown. A few contracts were given to new interests.

Officials of the aviation industry emerged from the maelstrom more confused than enlightened. They had tried to follow the government's wishes as indicated by Postmaster General Brown only to find that under a new Administration they were condemned for so doing. The sins of wild promotions and hectic speculation on which the New Deal hung much of its complaint violated no statutes and were not peculiar to the aviation industry. Even the alleged arch-devil Brown was given a clean bill of health some seven years later when the United States Court of Claims found no fraud or collusion in his handling of the air-mail contracts.

For years thereafter this cancellation of the air-mail contracts continued as a famous cause. Wherever flying men met it was condemned in forceful terms. Members of the industry and many of our citizens saw in it a tragic error in governmental administration. It was regarded as a precipitate, ill-considered act which with less haste and a higher regard for due process of law might well have been avoided. In their opinion the responsibility lay not so much with Farley as with the impetuous extremists of the New Deal and the President himself.

Following the return of the air-mail lines to business interests in 1934, the industry went through several years in the horse latitudes of uncertainty. The attitude of government seemed confused. Congress took its time and it was not until 1938 that a comprehensive statute was passed. In August of that year the Civil Aeronautics Act went into effect. It was both practical and forward looking. A new charter was given the industry under which it would achieve splendid growth and high performance. Taken with the amendments of 1939-1940, it is the law which today governs civilian aviation.

The industry's plea for an independent agency was recognized. The Civil Aeronautics Authority was established, comprising the Civil Aeronautics Board (CAB) and the Administrator whose acts are supervised by an Assistant Secretary of Commerce. The Administrator takes charge of federal airways, navigational facilities, control of air traffic, examination and rating of pilots and aircraft, etc. The CAB exercises far-reaching regulatory and judicial powers, authorized by Congress. Without its permission no lines may be started or abandoned. Through the issuance of certificates of convenience and necessity it controls competition. It has the power to regulate all tariffs, grant air-mail contracts, and determine rates of pay thereunder. In a thoroughgoing and comprehensive way, it legalized the principles of control which Postmaster General Brown had

tried so hard to achieve. Last but not least, it relegated to the limbo of forgotten causes the issue of competitive bidding.

The idea that passenger transportation would be the salvation of the industry has thus far been borne out. The number of passengers carried annually increased from 493,141 in 1933 to somewhere around 4,061,000 in 1941. In the latter year mail payments constituted less than 30 per cent of total air-line revenue, and by 1939-1940 the government's income from air-mail postage exceeded its payments to the air lines for carrying mail. Thus from a practical standpoint the subsidy aspect of the airmail contracts was seemingly disappearing. Our air transport system appeared about to realize the hope that it would be self-sustaining.

During the years when we were building this, the world's greatest system of domestic airlines, we also advanced brilliantly in the foreign field. Juan Trippe and his associates made Pan American Airways Inc. the outstanding enterprise in international air transport. Starting in 1927 with a U. S. mail contract for the little 90-mile jump from Key West to Havana, they pressed forward at such a vigorous pace that the system in 1942 added up to almost 100,000 route miles. Regular schedules were maintained from the United States to points in the Caribbean, Mexico, Central America, the east and west coasts of South America, Hawaii, the Philippines, China, Alaska, Bermuda, and Europe. The company's pioneer work in establishing transpacific and transatlantic routes was an operating triumph of the highest order.

But the building of fine systems of transportation is only part of the story. When Postmaster General Brown and members of the industry, back in 1930-1933, enlarged upon the military value of a strong civil aviation their statements were met with some skepticism. A Congress which could be downright niggardly with direct Air Force appropriations could not be expected to see much in the air lines from a defense standpoint.

A greater mistake could hardly have been made. For it was the rapidly growing needs of our civil air lines which helped to sustain a vigorous aircraft manufacturing industry. The requirements of the transport companies for larger planes, more powerful motors and better navigational devices put the United States in the forefront of technological development. Similarly, trained engineers, machinists, production men, ground crews, and pilots gave us a skeleton of experienced personnel from which to build. When war came we had the know-how. Our commercial planes were the best in the world and our aviation technicians second to none.

It was well that this was so. But our strength in the air was not attained solely from the technical knowledge which we possessed. Still another skill was required. We must produce on a scale never before achieved, in

amounts to stagger the imagination. The magic of quantity production was something we had already learned in our other great industries.

Thus when President Roosevelt electrified the nation with his Defense Message of May 16, 1940, and called for a production of 50,000 planes per year, his words fell upon good ground. Although the figure was astounding, he counted upon the skill and resourcefulness of our manufacturers. Protesting quite humanly that the thing was impossible, these men went to work. They not only accomplished the miracle; they just about doubled it. Production of aircraft went from 5,856 planes in 1939 to 12,871 in 1940 and to 96,369 in 1944. Even these figures fail miserably to indicate the scale of the accomplishment. Perhaps it is better summed up by saying that we took the small aircraft manufacturing business of 1939 and so magnified it that for the year 1944 it was the largest single industry in the world.

It was a proud achievement. We out-built and out-produced the best that the totalitarian nations could do. As much as any other factor the results contributed to the preservation of democratic freedom for hundreds of millions of people. That we could so perform was due in great measure to the fact that when the war struck we had in civil aviation a vigorous, going business. Its strength derived from the practical combination we had worked out involving government aid, federal regulation, and free enterprise. In its early phase the industry in a commercial sense offered lean reward. All the more credit therefore is due to the pioneers who sought to find business application for the flying machine—the ill-assorted pilot showmen of 1910–1917; the flying circuses following World War I; and the struggling, meagerly financed little companies which first flew the mail and carried passengers. Flaunting death and scorning favor, it was the devotion of youth to the cause of aviation which in the end enabled us to make of this a great industry.

GOVERNMENT AND BUSINESS

*Part One: Services, Subsidies,
and Public Utility Regulation*

THE growing intimacy between government and the economic life has been one of the striking characteristics of the twentieth century. Of all the trends of the period none was more pronounced. Over an ever-widening sphere of interest and in literally hundreds of forms, public officials undertook new activities for promoting the welfare of the citizen or for regulating his business conduct.

Nor were these things peculiar to America. The tendency toward paternalism in government was worldwide. Men's thoughts turned to stronger and more centralized state power. In its most extreme form, we saw this movement take complete control of economic life in the totalitarian states—Russia, Germany, Italy, Japan, and Spain. That we in America were affected only to a lesser extent was our great good fortune. Nevertheless, even here the movement has been of important significance.

Serving greatly to accelerate this trend were two world wars and an intervening worldwide depression. During hostilities the economies of the warring nations became subject to governmental direction. People got used to authoritarian controls. Furthermore, World War I and the depression which followed in its wake so dislocated the business machinery of the world that many persons despaired of restoring it. With common impulse people almost everywhere looked to government to get them out of their troubles.

Although this growing intimacy between government and the economy in the United States operated on three different levels of administration—local, state, and federal—there was a strong upward spiral toward more extensive federal activity. Local government was giving way to state, and state to federal. Government became increasingly remote from the citizen himself.

We have, of course, never lived under conditions of completely free enterprise, and would hardly wish to do so. We recall that the first colonists in the seventeenth century had been conditioned at home under policies of mercantilism, wherein the needs of business had been bent to purposes of State. Thereafter in this country we find colonial administration active in regulatory practices. Burgher rights were invoked to protect local merchants. At times wages and prices were controlled, as well as weights and measures. In Virginia the shipment of tobacco was subject to careful rules as to grading, marking, and packing. The Court in Massachusetts kept a jealous eye on shipbuilding and the golden trade in salt cod. Even monopolies were authorized as we note in a proclamation of Governor Dongan which decreed that in the colony of New York "noe flower be Bolted or Packed nor Breade made for Transportation in Any Place whatsoever within this Government Except in the City of New-Yorke."¹

Immediately following the adoption of the Constitution we find the federal government participating in various economic affairs. In order to stimulate invention and the development of our own industries, the government granted limited monopolies in the form of patents, a practice which we borrowed from England. Beginning with the first Tariff Act in 1789 we invoked the principle of protection. Within the next two decades Jefferson employed trade embargoes and nonintercourse as instruments of foreign policy. In later years Congress twice organized United States Banks which carried on commercial operations. Various states engaged in building and managing canals. Both federal and state governments subsidized railroad construction. In the Homestead Act of 1862 we attempted to foster agricultural development and western colonization.

Thus there has never been a time in our history when government was not participating with the citizen in his economic life and business adventure. Prior to the advent of the twentieth century, however, these interventions had been rare and usually restrained. Theretofore, the citizen, being closer to the operations of government, correctly sensed that a proportionate measure of individual liberty was sacrificed for each step that the government took into the economic area. Also he feared a growing tax burden and the rigidities and ineptitudes of bureaucracy. He realized that the degree of intervention was all important. While we admitted on occasion the legitimacy of monopoly, subsidy, and regulation, we recognized that their application must remain subordinate to other principles. Our philosophy of government conceived that the thing of paramount value was the freedom of the individual citizen in his economic as well as in his social and spiritual life. The state was the servant and not the mas-

ter. Spiritual, political, and economic freedom were recognized as inseparable.

In spite of this traditional aversion to the extension of governmental functions, its pace became rapid during the twentieth century, especially after World War I. In the case of the federal government, some idea of the over-all growth of these activities may be had by noting figures of expenditures. In 1900 the total federal budget was \$510 million, most of which went for defense, pensions, and interest. By 1916 the figure had reached only \$697 million. Then in the next twenty years things really began to happen. By 1936 federal expenditures had grown to over \$9 billion a year—an increase of over 1100 per cent. In the same period, 1916 to 1936, the aggregate of federal, state, and local expenses of government grew from \$3.28 billion to \$16.36 billion, a gain of about 400 per cent. The trend from state and local activities toward federal, and the increasing remoteness of the taxpayer from those who spend, may be seen in the fact that in 1916 federal expenditures accounted for only about 20 per cent of the total, while in 1936 they took well over 50 per cent.

Another measure of the broadened area of governmental activities may be had from noting the various instrumentalities which have been set up by the federal government for lending money to its citizens. In the years just prior to World War II there were twelve such principal agencies, all of which had received their lending powers since 1916. Banks, railroads, and business concerns might secure loans from the Reconstruction Finance Corporation. The merchant or manufacturer, unable to secure working capital advances through ordinary banking channels, might under prescribed limitations go to Federal Reserve Banks. The city or country homeowner could receive aid from the Home Owners Loan Corporation. Merchants in foreign trade looked to the Export-Import Bank for assistance in financing certain classes of business. But it was on the farmer that the sun of federal benevolence really shone and whose pressure lobbies had succeeded most magnificently. In one form or another he was helped by the Commodity Credit Corporation, Rural Electrification Administration, Farm Credit Administration, Federal Farm Mortgage Corporation, Federal Intermediate Credit Banks, Banks for Co-operatives, Farm Security Administration, and Federal Land Banks.

By 1938 the total number of regular employees of federal, state, and local governments had reached 4,223,000. In addition there were many others who received partial income payments from government in the form of work relief, social security disbursements, unemployment relief, agricultural benefits, and so on. During the years of the great depression these included a substantial portion of the total population. It has been esti-

mated that for the period 1933 to 1939 inclusive, relief or employment on work projects was extended on the yearly average to over 6 million households which included a total of some 20 million persons.²

Few people realized what a significant change was taking place by reason of these increased activities of government. Looked at from one aspect, by 1938 over 20 per cent of the income of our people had been socialized. In that year federal, state, and local administrations took such a proportion of the national income, to be expended by public authorities. By 1947, due in some measure to high defense appropriations the proportion was at least 25 per cent.

One cannot witness these developments without concern. The detrimental effect on the economy of this increase of the tax burden is not always apparent. But the greater the government "take" from the national income, the less there remains for the expansion of private productive facilities, increase of which in the past has been the means by which we improved our standard of living. It can well be imagined that in progressively increasing taxation there is a critical point after reaching which business development would be so retarded that pressure for continued socialization would become irresistible.

This growing participation by government in the daily lives of our people falls into two general categories. First are those activities concerned with providing services to advance the health, education, welfare, and convenience of our citizens. This field includes the maintenance of such things as roads, bridges, educational institutions, hospitals, parks, and playgrounds, as well as unemployment relief and social security.

In the second class are those instances where government, acting in an auxiliary capacity, has sought to assist or stabilize economic affairs by the promotion of specific industries or by regulatory functions directed toward the common good. Examples of such interventions are ship subsidies, air-mail contracts, public utility franchises, and the protective tariff, as well as railroad, motor carrier, and public utility regulation.

In the first category, that of providing services, the pace of developments during the last forty-odd years has been rapid. The principal areas of activity have been education, welfare, hospitalization, and, very striking in rate of growth, highway improvement. This latter activity has been carried on largely by the states. In the twenty-four years from 1919 to 1942 highway expenditures grew almost tenfold—from \$99 million to \$959 million. The extent of the advance may also be measured by the fact that whereas in 1904 out of 2,151,000 miles of rural roads only 153,530, or about 7 per cent, were surfaced. By 1942 we had upwards of 1,400,000 miles of surfaced highways, or almost 50 per cent of the 3 million mile

total. In the years after World War I, we find the federal government participating. Substantial grants-in-aid to the states for highway work became a growing practice.

Similarly educational facilities have been expanded. State expenditures for these purposes grew from \$61 million in 1902 to \$952 million in 1942. In consequence our advances were remarkable both in general education and specialized training. In 1900, for example, only one out of every fifteen of our people between the ages of 14 and 17 attended high school. By 1934 the ratio had increased to as high as two out of every three. Only one out of every twenty-five attended college in 1900, while in 1936 one out of eight was so privileged. Meanwhile vocational and technical training had become standard facilities available to the public generally in all sizable communities. We have thus added greatly to the means whereby our youth may fit itself for any of the manifold careers of the modern age and be enabled to make a contribution to the advance of society.

An idea of the growth which has taken place in municipal activities since 1900 may be had by noting some of the services inaugurated by a typical, large American city:

1902 Medical inspection of school children	1917 Recreation camps
1905 Evening high schools	1920 Medical college
1906 Tuberculosis hospitals	1922 Maternity hospital
1908 Public health nurses	1922 Golf courses
1910 Classes for defective speech, cripples and mental defectives	1925 General college
1914 Old age support	1925 Symphony concerts
1915 Pasteur institute	1927 Law college
	1928 Cancer clinic

Few people will rise to criticize these added functions. Excellent social purposes were served by all of them. We have experienced a marked advance in our sense of social responsibility. A rising standard of living brought ideas of better service and the means of paying for it. Health, welfare, and educational activities of our cities and states increased enormously.

It is only by recognizing this broad trend that we can understand the entrance of the federal government into the field of local relief. The occasion was provided by the economic distress of the depression of the 1930's. Conditions of unemployment during those years were so serious and widespread that extraordinary measures were called for. Accordingly, the immense riches of federal taxing powers were drawn upon to afford direct relief, work relief, unemployment insurance, and old age insurance.

Thereafter the federal government would concern itself with critical social problems which formerly had been handled solely on the local and state levels. This was not unnatural. Improved communications were drawing our people together to constitute the nation as an integrated community.

Also involved in the broad extension of governmental activity was a gradual expansion into areas of service formerly carried on by private enterprise. On the level of local administration, we find many communities either establishing or taking over water supply systems. Others undertook the production of electric power as well as the operation of transportation facilities, docks, wharfs, cemeteries, and even radio stations.

Outstanding in this area was the acquisition by New York City of its subways and elevated railroads. From the standpoint of passengers carried, this made that municipality one of the leading operators of transportation facilities in the world. Of equal interest was the creation of the Port of New York Authority by joint action of the States of New Jersey and New York. This agency has built, financed, and is now managing tunnels, bridges, and office buildings. It will shortly finance and operate a huge new airport.

Some of these public service developments are of such a nature that construction and operation by private enterprise would be definitely inadvisable or even impractical. On the other hand, controversial issues were raised by government's entrance into the public utility field of supplying electric light and power. On the level of local government this was not new. From the very outset of the electrical industry certain municipalities financed and operated their own lighting plants. Except in a few cases these were usually small, community installations. Up until the advent of the New Deal, the movement did not keep pace with the growth of companies financed and operated under the profit motive system. The latter, of course, possessed greater flexibility from the standpoint of merger, integration and development into regional systems as science fostered large-scale operation.

In the 1930's, however, a change occurred. One of the most aggressive New Deal policies was an attack on public utility holding companies. This undoubtedly fostered in some quarters an attitude favorable to government ownership of operating companies. Concurrently in its campaign for depression relief the federal government, through the Public Works Administration, advanced large sums of money to finance construction of local electric projects.

No particular excitement was caused by these developments on the municipal level. The real fireworks were set off on the federal plateau. The launching of the Tennessee Valley Authority, or TVA, probably has

caused more heated controversy than all other adventures of government in the electric power field put together.

While clothed with the appearance of reclamation purposes, TVA was in reality an extensive experiment by the federal government in the social field. The ideas of flood control, improvements in navigation, and so on, soon became subordinate to more far-reaching concepts. The principal goal was to raise the standard of living of submarginal communities by making electric energy and electrical equipment widely available at low cost. Concurrently, it was expected that the results would provide a yardstick for measuring the fairness of public utility rates charged by privately operated companies in other sections. This program was in effect a socialization of the public utility industry over a large area.

No attempt will be made here to appraise the TVA experiment or the power projects on the Columbia and Missouri Rivers. The time is yet early. The issues are broad and far-reaching. Many persons believe that if given opportunity privately operated companies under public regulation could do an even better job, spurred on as they are by individual initiative and that powerful incentive—the profit motive. Ordinary utility companies which pay the substantial taxes not assessed against these public authorities dispute the latter's claim to lower costs for generating and distributing power. That this differential is important may be judged from the fact that in 1945 electric utilities alone paid over \$650 million in taxes which amounted to approximately 20 per cent of the revenue received from the sale of power to ultimate consumers.

The second broad category of governmental activities is that in which the State intervenes in business affairs to impose regulation or to foster development through the granting of particular forms of aid. Free enterprise carries on, but subject to varying degrees of governmental planning, control, or subsidy.

The most venerable system of federal intervention is the protective tariff. It has been with us for over 150 years, since our birth as a free and independent nation. In fact it has become so integral a part of American business life that we have lost sight of some of its characteristics. By its operation, various industries and fields of agriculture have been particularly favored as compared to others in the economy. Nevertheless for many years the tariff served in building up our manufacturing and in upholding the scale of living of American workmen.

Governmental intervention to regulate our business life has, of course, not been limited to the activities of the federal government. One phase involving the exercise of state power is second to none in importance. This is public utility regulation. For all practical purposes, it started in 1907

when Wisconsin and New York enacted legislation since recognized as opening new horizons in the relationship between government and business.

By its very nature the public utility company constitutes a wide-open invitation to public regulation. It derives its economic position through a grant from the state of either partially or totally exclusive privileges of public service. It generally makes use of highways and is often granted the right of eminent domain. In one degree or another it assumes aspects of licensed monopoly. A correlative of monopoly under a democratic system of government is some form of regulation.

The Wisconsin Public Utility Law of 1907 has frequently been referred to as the prototype which other states followed in setting up their regulatory bodies. For those days this statute was revolutionary. The Wisconsin Railroad Commission was given jurisdiction over common carriers, water, gas, telephone, and electric light and power companies. Companies in these fields must file rate schedules and the Commission, after hearings, had the power to order changes and modifications in rates. Complementary thereto was the authority to impose uniform systems of accounting and the right to determine property valuation. The movement spread quickly. By 1917 half the states had established such commissions and by 1930 all of the states except Delaware had done so.

Now with some forty years' experience in this field, the question may legitimately be asked, how well have these state commissions done? Remarkably well, when everything is considered. This is not, however, by way of saying that they have been free from mistakes of policy and from administrative weaknesses. They suffer from disabilities which are inherent in governmental activity. Their procedures are often cumbersome and time-consuming. Regulations and orders have frequently been overly rigid and slow to reflect changing conditions. Mistakes have been made both in invoking too much authority and in employing too little. Because of limited appropriations they have at times failed to bring to important regulatory problems men adequately equipped to handle them.

But by and large consumers have been well satisfied with the quality of service and rates charged by the utility companies which have been thus regulated. Standards of service have been maintained on a level to challenge the world.

It should be noted, however, that state commissions do not have the final word in determining rates. Under the Constitution a reviewing authority exists in the courts. The Fourteenth Amendment provides, in part, that the states may not enact laws which deprive persons of property without due process of law. As a result the United States Supreme Court is the ultimate

arbitrator. That tribunal in 1898, on a question of railroad rates, established a yardstick to which subsequent rate decisions have been related. In *Smyth v. Ames* the court stated, "the basis of all calculations as to the reasonableness of rates . . . must be the fair value of the property being used. . . . What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience." ^a Rates which denied such return were confiscatory.

The rule in its simplest terms is easy to state but its application has been difficult. To determine "fair value" and "fair return" in particular cases has caused unending litigation and controversy. One of the great legal battles of our time has been waged by partisans of three different methods of valuation—original cost, reproduction value, and the prudent investment formula.

Although over-all rate adjudication is involved and cumbersome, the net result of state regulation to the economy has been favorable. Speaking broadly, both commissions and the courts have wisely permitted the utility companies to charge rates which ensured an adequate earning power when measured by practical standards. As a direct consequence the industry as a whole has attracted a steady and abundant flow of new private capital.

This has meant that technological advances could be quickly applied through new and more efficient equipment. Capital investment has gone up and costs have gone down. For each workman in the electric light and power industry, by 1947 some \$50,000 of capital had been invested. As a result productivity per worker grew as new money provided improved generating machinery and distribution facilities. This made it possible to raise wages and at the same time reduce the price to the consumer. The cost of electric power in domestic and residential service has gone down from approximately 7¢ per K.W.H. in 1926 to 3.22¢ per K.W.H. at the end of 1946. The per customer annual consumption of electrical energy in residential use has increased over 200 per cent in that same period. We have thus experienced an enormous increase in this phase of our standard of living.

This is a challenging record. Basically, it was made possible by the splendid accomplishments of our engineers in providing an expanding technology. But without forward-looking management and heavy investment of private capital this would have gone for naught. Finally, state regulation in the utility field must be accorded due credit. Its administrators and the courts gave the profit system sufficient scope in which to perform successfully. This record constitutes a hopeful augury for the future.

XLII.

GOVERNMENT AND BUSINESS

Part Two: Regulation of Interstate Carriers

EVEN before the states had embarked on the regulation of our public utilities, the federal government had undertaken broad responsibilities in this field. In 1887, under the authority of the commerce clause in the Constitution, Congress passed "An Act to Regulate Commerce." This law created the Interstate Commerce Commission and charged it with responsibility for regulating the railroads. We thus have a sixty-year record with which to measure the success of federal regulation of an important industry.

As the story unfolds, it discloses what many believe to be an inexorable law of such activities. Once a beginning is made, encroachment on the functions of private management continues at an accelerated rate. How much this tendency may have been justified or necessitated by the particularly complex problems of the railroads, it is difficult to say. Nevertheless the record remains. Starting in 1887 with shadowy powers, the Interstate Commerce Commission is vested today with authority to make important decisions which ordinarily give private management its character and by which its quality is determined. Government not only calls the tunes but plays first fiddle.

In observing the nature and appraising the success of this effort at federal regulation, it is important to note that the Interstate Commerce Commission has been the particular creature of Congress. It was established as an agency by that body and since 1889 has reported directly thereto. Hence the sensitivity of Congress to changing public opinion is reflected in the record of the Commission.

Another fundamental difficulty has been that age-old dilemma of government: how to achieve a practical compromise between tendencies toward monopoly and conditions of wide-open competition. From its in-

ception the Interstate Commerce Commission has worked under Congressional directives which sought to secure adequate railroad service at low cost by promoting active competition between the carriers.

In its early days the Commission carried the flag of the shippers, particularly of small agriculturalists whose activities had largely been responsible for its establishment. As a result, all forms of cooperation between the railroads were discouraged. Competition became so keen as to amount to industrial warfare. "A wide variety of devices were used by individual carriers in the competitive struggle to attract traffic to their own lines, and out of this situation there developed the inevitable wastes of cross-hauling, circuitous routing, and uncoordinated terminal operations."¹ We gradually came to see the inefficiency of such a program. More recently, especially since 1920, congressional policies have changed. While still predicated upon principles of competition, effort has been directed toward mitigating their ill effects. Government has even gone so far as to promote some consolidations and pooling agreements.

The issue which brought the I.C.C. into being was the belief of many shippers, particularly those in agricultural areas, that the railroads were discriminating unfairly between individual shippers, different commodities, and between shipping territories. To remedy this condition, the Act of 1887 laid down for the guidance of the I.C.C. certain broad rules. Rates must be reasonable. Unjust discrimination was prohibited. Undue preference must not be granted. Further, the roads must not discriminate in favor of the long-haul as against the short-haul. To carry out the theory of enforced competition, the railroads must discontinue pooling agreements by which traffic revenues in certain areas were lumped together and divided on a fixed basis between competing carriers.

The enforcement authority of the I.C.C. in the period down to 1906-1910 was indirect. It reflected the traditional thinking of our people against governmental controls. The Commission was supposed to act as auxiliary to the courts in procuring for individual shippers the fair and equitable treatment prescribed in the statute. It could investigate, publicize, and provide complainants with evidence to be used in a court proceeding seeking redress for losses sustained. But when the Commission attempted an experiment in the realm of rate fixing, the United States Supreme Court denied the power in explicit terms.²

Although these years witnessed a gradual decline in the over-all level of freight rates and more than a doubling in amount of business handled, the public and Congress were not satisfied. It was decided to give the I.C.C. more power and to extend its jurisdiction. Accordingly the Hepburn Act was passed in 1906 and the Mann-Elkins Act in 1910.

By virtue of these laws the Commission was granted authority, upon complaint, to fix maximum rates and under certain conditions to decree suspension of changes in rate schedules pending investigation. The Commission's orders were made more authoritative and effective penalties prescribed for violations. Special emphasis was laid on eradicating rate discriminations in favor of the long-haul as against the short-haul. By the Hepburn Act, the I.C.C. was given jurisdiction over private car lines, pipe lines, express companies, and sleeping-car companies. Under the Mann-Elkins Act, telephone, telegraph, and cable services were also made subject to I.C.C. control.

Government thus moved into an entirely new area as far as federal regulation was concerned. Congress had changed from a negative, indirect approach to one that was vigorously affirmative. The idea of relying upon the traditional method of legal action for damages sustained was in a substantial degree abandoned in favor of placing directive power in the hands of an agency of Congress with the thought of forestalling such damages. However, still in the background was the philosophy of legislatively imposed competition.

The initial test of this increased regulative authority occurred between 1910 and the outbreak of World War I. It yielded conflicting results. The roads encountered rising operating expenses and endeavored with little success to secure compensating rate increases. Shippers benefited from relatively stable railroad freight charges during an era of rising prices. The carriers on the other hand suffered. Unable to get adequate rate advances, they were at the same time denied the opportunity of reducing costs by co-operative efforts and consolidations. Competition became cut-throat. When World War I broke out, the railroads were poor financially and their equipment was far from being in topnotch condition.

Our entrance into the war precipitated problems with which neither the I.C.C. nor the roads were able to cope. The emergency required that the roads be operated as an integrated national system. This was easier said than done. It was difficult for the carriers, schooled in conditions of legislated competition, to put aside competitive advantages built up through years of battling in order to cooperate with erstwhile opponents. Nevertheless the roads faced this issue with patriotic spirit and voluntarily organized the Railroads' War Board to promote unified operation. The I.C.C. was given power to control the use of cars in furtherance of the war effort.

Whether this arrangement might have worked is difficult to say. A concurrence of other factors produced a situation of acute crisis. In the first place a strange anomaly had developed. Although a pooling of facilities

and integrated operation of the railroads was essential for prosecution of the war effort, the Attorney General was far from reassuring about the railroads' liability for such acts under the Sherman Anti-Trust Law. Meanwhile expenses were mounting, labor problems threatening, and the financing of railroad operation was becoming increasingly precarious. An unwise concentration of war orders in New England had disrupted normal freight movements. Then as the winter of 1917-1918 advanced, weather conditions threw traffic into a snarl just as the roads began to feel the impact of the war. The situation was confused and unpromising. If we were to get on with the war, the railroads must be given relief and the transportation system brought under more unified direction.

Accordingly, on December 26, 1917, the President, invoking his emergency war powers, took over the railroads and placed responsibility for their direction upon the United States Railroad Administration. Actual operation was, of course, left in the hands of private management but government control by-passed the Sherman Anti-Trust Law. The roads could work together, cooperate, and pool their resources of men and equipment. Under this arrangement, the contribution of the carriers to the war effort was excellent.

The war experience proved instructive to both railroad management and Congress. Government began to see that its cherished principle of enforced competition was not the miracle-working formula it had supposed. Traditional philosophy was modified to the extent of opening the door for a degree of cooperation and for a long-range plan of consolidation.

This new attitude of Congress was implemented by the passage of the Esch-Cummins Transportation Act of 1920. This statute reflected the war experience by approaching the railroad problem from the viewpoint of trying to provide for an integrated, smoothly cooperative, national system of rail carriers. For the first time an affirmative declaration was made of the right of the roads to earn a fair return on their properties. As applied, this was to be 5% per cent per annum. A new feature was then interjected—the much-discussed “recapture clause.” By this it was provided that if in any year a road's earnings exceeded 6 per cent on its value, one half of such excess was to go to government to be used as a fund for loans to railroads in need of assistance.

The Commission was given authority to determine as between roads a just division of charges for jointly handled business and to establish specific as well as minimum rates. Similarly it was granted power over the issuance of railroad securities, abandonment of old trackage, and the laying of new. Furthermore the carriers were encouraged to propose con-

solidation of lines. Finally that original sin, the pooling agreement, was legalized under I.C.C. supervision.

To the railroads and their investors this looked like the dawn of a day in June. Because of the statutory declaration of the right to a specified return on capital, they believed that henceforth the rate levels would be such as to ensure adequate earnings. As a result there was for a time a liberal flow of new capital into the business. Furthermore, by reason of the war experience of unified operations, many economies and improvements were instituted. But in spite of the rosy outlook, the honeymoon was of short duration. Rates slowly declined from 1921 to the years of World War II. To complicate further the carriers' problems, Congress had embarked upon new adventures.

Beginning in 1916, the federal government had been granting large and increasing sums to the states for highway improvement. Similarly federal aid was given for the promotion of inland waterway and air transport facilities. Commendable as these purposes were, they seem to have been adopted without regard to the over-all traffic needs of the country. The situation was somewhat anomalous because Congress, through its agent the I.C.C., was bearing down on railroads while in effect partially subsidizing other forms of transportation. The growing competition of motor trucks was particularly damaging to the railroads and was not taken under federal regulation until 1935.

The fundamental trouble, however, was confusion of purpose and inertia of administration on the part of government. In the first place, there still lingered the old philosophy of enforced competition between the railroads despite the fact that so many of their policies were now being determined by public direction rather than by private management.

Then there was the difficulty of arriving at a valuation of carrier properties upon which to calculate a fair return. The roads naturally strove to secure as high a valuation as possible and had the right to take their differences to court. Protracted litigation resulted, marked by wide differences of opinion between the I.C.C. and the courts. The peak of this controversy was reached in 1929 when the Supreme Court upset long years of I.C.C. valuation studies for failure to take properly into account the cost of reproduction.²

Thus from declining rates and the impact of new competition, railroad earnings suffered badly. Only on two occasions, and these in years of ample prosperity, did the railroads succeed in earning the statutory return of 5% per cent per annum on fair value. Stemming from this paucity of profits was a growing lack of interest on the part of private capital, espe-

cially that of the risk-taking type. Neither men nor money seek a starvation diet.

It took the depression which started in 1929 to bring to light the essential weakness in the policies by which Congress and the I.C.C. had been guided. When the impact of hard times struck, the carriers were indeed vulnerable. Few roads had been able to build a surplus looking toward a rainy day. Their liquid resources were scanty and after a year or so of abnormally low revenues, they were in desperate straits. "In 1932 roads controlling nearly three-quarters of the mileage of the country failed to earn their fixed charges and were saved from bankruptcy only by the lenience of their creditors or by loans, mostly advanced by the government."⁴

Whatever viewpoint one may take about government intervention in business there is one point which must be conceded by friend and foe alike—when its wards get into trouble, emergency help is usually prompt and liberal. How much this factor contributes to sound long-term management is another question.

In any case, during the great depression the federal government, through the Reconstruction Finance Corporation, advanced large sums to the railroads. In addition the Emergency Transportation Act of 1933 was passed. It created a Coordinator of Transportation who was expected to promote operating economies, advance financial reorganizations, improve service, and foster consolidation. He was supposed to be the father confessor, benevolent despot, and czar of the railroads. Congress, however, had drawn the magic from his scepter by a provision in the law that none of his moves should result in a reduction in the number of railroad employees.

It is not surprising that the Coordinator in his study of the over-all transportation needs of the country came to the conclusion that our regulating policies lacked unity of purpose. Accordingly Congress passed the Motor Carrier Act of 1935 which placed over-the-highway common carrier transportation under the jurisdiction of the I.C.C. Thus one agency of government was made responsible for coordinating and regulating the two leading forms of overland traffic.

This decade of the 1930's was one of prolonged and discouraging struggle for the carriers. Weekly car loadings, which in the late twenties averaged almost 1 million cars per week, fell to around 600,000. Similarly, passenger revenue dropped from upwards of \$1 billion per year (1920-1926) to below \$400 million for the years 1932 to 1935. During four years of depression operation, Class I railroads showed an aggregate deficit in net income.

As a result, the roads were unable to maintain equipment in an efficient condition by the retirement of old and the purchase of new locomotives and cars. Whereas in the ten years preceding 1929, locomotives built for domestic use ran anywhere from 600 to 3500 per year, for the ten years ending in 1940 the yearly average was only about 230. Similarly the production of new freight cars dropped from above 80,000 to as low as 2163 in 1933.

This of course meant that the railroads were forced to live on a starvation diet as far as equipment was concerned. They were slowly eating away the capital built up in previous years, with no compensating replenishment. At the outbreak of World War II some 68 per cent of locomotives owned by Class I railroads were at least twenty years old. About 40 per cent of our freight cars were of the same vintage.

One of our surprising achievements in World War II was that railroad management, handicapped by inadequate, partially obsolete equipment, was able to move the huge numbers of men and quantities of goods required to attain victory. Noteworthy also was the fact that, as distinguished from World War I, it was not necessary for government to take over the carriers in order to secure integrated operation. The roads worked in harmony and supplied the nation with an efficient system of war transport.

In reviewing this summary of railroad regulation since its inception in 1887, certain facts stand out. Many of the basic purposes of federal regulation have been achieved. Both in peace and in war, the railroads have given the country adequate railroad service. Over the years service and facilities have improved. High standards of safety have been maintained. On the other hand, especially for the period from 1920 down to World War II, the railroads were unable to sustain themselves in a condition of financial strength.

The record shows strikingly one truth which we must learn if we are to make public regulation successful. Attenuated earnings do not suffice to keep an industry strong and vigorous. Profits must be liberal enough to attract risk capital. State regulation of the utilities has been conducted on such a basis. With the railroads, however, Congress and the I.C.C. pursued policies which were both parsimonious and short-sighted.

The history of railroad regulation illustrates another difficulty of governmental regulation. Both Congress and the I.C.C. were constantly under pressure by organized groups of shippers demanding reduced rates. For example, it was usually easy to generate sympathy in Washington for granting rate concessions to the farmer. In such cases it is obvious that members of Congress, try as they might, would find it hard to maintain

an objective viewpoint. There were a lot of votes on the side against the railroads.

Important also to note is the gradual accumulation of power by the I.C.C. and its deep penetration into the field of free enterprise. "The concept of public managerial supervision has been gradually substituted for the original concept of public regulation which consisted mainly in the attempt to maintain competition and to control discriminatory practices." ⁵

Perhaps this extension of authority could not have been avoided. Certainly as Congress changed from principles of enforced competition to those involving cooperation between the roads and eventually consolidations, there was justification for increasing the degree of regulation. The question is whether we have not gone too far in taking responsibilities from private management.

While the railroads were being treated as erring step-children by a cold-eyed Congress, another form of transportation was faring better. The fledgling air lines were being fattened up. Except for the disruptive experience when the air-mail contracts were canceled by President Roosevelt, down to World War II government intervention in this field was marked both by foresight and understanding. Had it not been for the assistance given by the Post Office Department and the Department of Commerce, the development of commercial aviation in the United States would have been greatly retarded. Since 1946, however, government policies as to the air lines have shown serious confusion.

Federal regulatory control was not confined to the railroads and air lines. Our telephone, telegraph, and cable companies were put under the Interstate Commerce Commission in 1910. Federal control of radio was formalized in 1927. Eight years later the Federal Communications Commission assumed jurisdiction over cable, telegraph, telephone, and radio companies. In 1920 the Federal Power Commission was given authority over the generation of power on streams which are subject to federal control. In 1935 and 1938, respectively, federal regulation was extended to interstate movement, at wholesale, of electrical energy and natural gas. These interventions were to be expected. So far they indicated a growing but not a disturbing tendency toward federal paternalism.

XLIII.

GOVERNMENT AND BUSINESS

Part Three: Economic Planning and Social Objectives

WE have followed the record as the federal government undertook regulation of carriers engaged in interstate commerce. It was but one area of activity. Others were opened as both the legislative and executive branches extended their authority over our economic affairs. Such a concentration of power in the national capital had not been foreseen by the Founding Fathers. Hence one of the pressing problems of government during the twentieth century has been to find constitutional grounds for new administrative responsibilities. This was not easy. While our great charter has been distinguished for its flexibility, it was now at times to be stretched to the critical point as both Congress and the Executive greatly extended their activities.

Authority was sought largely through the "commerce clause" of the Constitution. This provides that: "The Congress shall have power . . . To regulate commerce with foreign nations, and among the several States, and with the Indian tribes. . . ." Just a bare handful of words! But from these phrases was to be derived, through constantly changing interpretations, that vast aggregation of federal power which today permits the government to intervene in so many phases of our economic life.

The power to regulate interstate commerce thus vested in Congress was not comprehensively invoked, except in the case of the railroads, until the age of industrialization was well advanced. Then in 1890 Congress passed the Sherman Anti-Trust Act. This statute, stemming from the commerce clause but deriving also from the common law, declared in effect that contracts, combinations, or conspiracies in restraint of commerce between the states or with foreign nations were illegal.

Responsibility for enforcement rested, of course, with the executive

branch. For some years there was a disarming quiet. Then suddenly the Sherman Law was brought to life in a sensational manner. President Theodore Roosevelt inaugurated his famous "trust-busting" campaign early in his administration (1901-1909).

Alarmed by the growing size and increasing concentration of power of some of our large business concerns, Roosevelt determined that the time had come for government to apply effective restraints. He had unerringly sensed that on this score public opinion could be quickly aroused. With his customary vigor the Rough-Rider President threw himself into an aggressive attack on certain large business combinations, some of which were undoubtedly vulnerable. This was graphically described at the time as the wielding of the Big Stick. In the following administration President William Howard Taft with less fanfare but with firm purpose carried the campaign forward.

The success attained was moderate. It was somewhat disappointing to the more ardent crusaders for reform. Accumulation of evidence was time-consuming and the prosecution of cases involved many complexities. Nevertheless by 1911 decrees of dissolution had been issued against several large combinations, notably those in oil and tobacco.

The fundamental trouble was that new paths in law were being traced. The courts ran into two basic difficulties. Just what constituted interstate commerce? Secondly, how could the application of the Act be reconciled with that forceful and obvious economic trend of the new century—the concentration of business into large units? Big companies operated in many instances to reduce the price of goods and thus raise our standard of living. Between this tendency toward mass production and distribution and the Sherman Anti-Trust Law there was obviously a conflict of philosophy. The courts tried hard to reconcile it.

One significant attempt at compromise was made when the Supreme Court evolved what was called the "rule of reason." In effect this meant that combinations in restraint of interstate trade which would have been reasonable under the common law were not prohibited by the Sherman Act.

Similarly in legislation Congress found itself steering a course of conflicting purpose. The Clayton Act in 1914 declared that certain acts of large companies constituted unfair competition and were unlawful. On the other hand an attempt was made to remove certain groups from the operation of the statutes. In somewhat indefinite terms, nonstock, nonprofit organizations of farmers and laborers were declared exempt. This was hailed as a great victory for organized labor.

In later years pooling agreements among railroads and between ship-

ping lines were permitted under the supervision of the Interstate Commerce Commission and the Shipping Board respectively. The Webb Export Combination Act allowed business concerns to combine as regards their export operations. In domestic trade, the Miller-Tydings Act permitted price maintenance agreements in the sale of branded goods at retail. On the other hand the Robinson-Patman Act of 1936 went after big merchandising organizations although the law was couched in general terms. It was made unlawful to discriminate in price between one individual and another or between different localities.

Added to these problems of reconciling the theory behind our anti-trust statutes with the evolution of modern business there were others involved in the broadening aspect of paternalism and the growing tendency of the federal government to pursue social objectives.

Such matters began to press for attention shortly after the turn of the century. About the time that Theodore Roosevelt started his "trust-busting" campaign, the Supreme Court opened the door to new concepts of congressional power. The decision in *Champion v. Ames*¹ handed down in 1903, sustained an act of Congress excluding lottery tickets from interstate commerce. The ground for this exclusion was that lottery tickets were harmful to such commerce. This reasoning was, of course, forced. What Congress was really trying to do was to protect persons from practices believed to be detrimental to the general welfare.

For the next thirty-odd years, down to 1937, the power of Congress was slowly extended. The Supreme Court sustained its right to prohibit the transportation across state boundaries of harmful food and drugs, women for immoral purposes, intoxicating liquors, diseased plants, and kidnapped persons. Obviously Congress was concerned not so much with regulating interstate commerce per se but rather with using such regulation to effect broad social purposes.

In giving legal sanction to the new activities of Congress, the Supreme Court at first invoked certain principles of limitation. Authority was denied where things prohibited were not in fact harmful or where the relationship to those affected was remote and indirect. But the late 1930's brought a revolutionary modification of this concept. Abandoned were the tests previously applied. The bars were let down and by a series of remarkable decisions the Supreme Court confirmed congressional authority to regulate practically all fields of American business and social life. As the decade ended and we entered the years of World War II Congress had attained almost plenary regulatory powers.

This change in our traditional ideas could only have taken place under the impact of extraordinary forces. These came into play during the 1930's

in the form of the great depression and the advent of the New Deal. In their troubles our citizens turned to the state for assistance as people the world over were doing. The public mind became receptive to increased governmental intervention. Concurrently, President Franklin Delano Roosevelt and his associates were committed to a social crusade of radical and far-reaching objectives. Measures aimed at restoring order to the economic system were adopted but the New Deal was not content with this urgent purpose. It took occasion to interject provisions involving long-range social planning. In pursuit of such objectives the New Deal high command secured from a pliant Congress the passage of a series of measures granting to executive agencies, in a hitherto unknown degree, broad powers over many parts of our economy.

When these laws were first brought before the Supreme Court, they ran head-on into the traditional limitations which had theretofore ruled to restrict the power of Congress. One after another they were declared unconstitutional. In 1935 the grandiose attempt at organizing the leading industries of the country by means of "codes of fair competition," the NRA, was nullified. Federal regulation of the petroleum industry was denied. The first Frazier-Lemke Act for the relief of farm mortgagors went by the board. In 1936 the Agricultural Adjustment Act of 1933 was held unconstitutional, as was the law designed to regulate wages, hours of work, and prices in the bituminous coal industry.

This was highly disturbing to President Roosevelt who had been re-elected in 1936 for a second term by an overwhelming majority. The New Deal interpreted his success as a mandate from the people to go forward with the many reform measures. The Chief Executive and his coterie of unofficial advisers saw their whole program of recovery and social change held up by the limiting decisions of the Supreme Court. Something must be done about it!

Accordingly on February 5, 1937, the President sent to Congress a message which startled the nation from coast to coast. Entitled "A Recommendation to Reorganize the Judicial Branch of the Federal Government," it was to occasion a popular protest of major proportions.

By its terms as well as by its method of presentation to the people, it was made to appear as designed to improve the efficiency of all federal courts. Unfortunately such declaration of intent was not entirely frank. The real purpose was to change the complexion of the Supreme Court so that New Deal legislation would not be so frequently declared unconstitutional. This was to be accomplished by a provision in the proposed legislation that when a Justice had reached the age of 70 the President would have the power to appoint an additional one. Thus President Roose-

velt would have had the right to appoint six additional Justices to the Supreme Court as there were that many who had already attained the prescribed age.

The measure quickly became known as the "Supreme Court packing bill" and was greeted throughout the nation with rising hostility. For several months administration leaders fought an all-out battle on Capitol Hill to muster enough strength to secure its passage. In opposition, the people themselves were speaking. Seldom if ever had members of Congress been so deluged by communications from their constituents. Through the years the Supreme Court had won a position of revered esteem. Our citizens looked upon it as the ultimate stronghold of their liberties. It was made plain beyond misunderstanding that they wanted the New Deal and its congressional supporters to keep hands off. The Roosevelt proposal died a lingering death.

While he thus lost the frontal engagement, the President was in fact winning the battle. The trend of opinion in the Supreme Court itself was going through a marked change. The Justices had apparently reached the conclusion that all this pressure for increased power for the federal government reflected a basic transformation in the lives and thinking of our people. The highly industrialized economy of the twentieth century undoubtedly necessitated adjustments between it and the government. From the election returns of 1936, clearly much that the New Deal proposed was approved by the people.

Beginning in 1937 the Court handed down a series of decisions which in trend of thought largely abandoned the limitations theretofore imposed on the power of Congress to regulate interstate commerce. Instead the "commerce clause," that doorway of magic flexibility, was so interpreted as to give to Congress new, extraordinary, and far-reaching authority.

The extent of the change may be seen by noting a few of the decisions which implemented this new philosophy of government. In 1937 the Supreme Court sustained the constitutionality of the National Labor Relations Act of 1935, the so-called Wagner Act. Referring to this Law in a later case the Court stated: "It has been settled by repeated decisions of this Court that an employer may be subject to the National Labor Relations Act although not himself engaged in commerce."²

Similarly the constitutionality of the Agricultural Marketing Agreement Act of 1937 was upheld. An order thereunder was supported which prescribed the method of payment and prices for milk as between a farmer and a local collecting plant when the milk was destined for use in another state. The Agricultural Adjustment Act of 1938 in regard to the assignment of quotas in the marketing of tobacco was also sustained.

Then in 1941 came the case of *United States v. Darby*,³ in which the Supreme Court by a unanimous decision declared constitutional the Federal Fair Labor Standards Act of 1938. This law "prohibited the shipment in interstate commerce of goods produced for interstate commerce by employees whose wages and hours of employment did not conform to standards prescribed by the Act."⁴ Subsequently it was held that the minimum wage and overtime provisions of this Act applied to employees of a loft building whose only relationship to interstate commerce was that some tenants of the building were manufacturing goods principally for interstate commerce. Also an employer of an oil drilling crew which failed to strike oil was held to be under this Act because a succeeding group did produce oil which was transported beyond state lines.

In 1943 an important decision was handed down when the Supreme Court held that the transaction of fire insurance business between persons in different states constituted interstate commerce. This aroused much interest because it opened the door for the federal government to enter a field theretofore subject exclusively to regulation by the states.

These are only a few of the decisions of the Supreme Court which reversed previous lines of thought and gave to Congress far-reaching power in the regulation of business. The portals of the commerce clause have been so widened that almost any vehicle of federal regulation and planning may be driven through. This extension of authority has taken place largely within the last decade during which the impact of World War II has pretty much dominated our economy. Hence we have yet to experience during normal years of peace the full effect of such momentous changes.

In thus pursuing enlarged authority over our economic life the New Deal had two basic objectives. Its members sought to improve the lot of the farmer and strengthen the position of the working man. Practically all of its legislative measures of social purpose were directed toward these aims.

The farmer became the recipient of extensive aid and much attention. That active sympathy should have been aroused in his behalf is not to be wondered at. In large measure he had failed to participate in the prosperity of the 1920's. Thus when the depression of the early 'thirties struck he had little fat on his bones. With farm prices going to new lows his position was desperate.

While federal assistance to the farmer took a multitude of forms there was one principle which was basic. This was that his purchasing power should be maintained at a satisfactory level in regard to other prices. With such an end in view the government undertook various responsibili-

ties directed toward production control as well as the stabilization and support of market prices.

Outstanding in this program was the Agricultural Adjustment Act of 1938 which, as we have seen, was one of those upheld by the Supreme Court subsequent to its change of viewpoint following the Supreme Court packing episode of 1937. This law provided for production allotments and benefit payments. The Secretary of Agriculture was authorized, when supported by a two-thirds vote of producers of certain staple crops, to set marketing quotas for all production. Another feature was the "ever-normal granary." This formalized and improved the policy of buying up surplus supplies of wheat, cotton, and corn so that they would not overhang the market and might be carried forward into years of less than normal production or made available for emergency demands. Export subsidies were granted under certain conditions on wheat and cotton.

In addition to these newer measures of assistance, the farmer for years had been the recipient of increasing financial aid. This built up until by 1940 he could borrow from the federal government for almost every operating need including the purchase of seed, acquisition of equipment, and the carrying of harvested crops. He was also given liberal help through farm mortgages.

One of our adventures in the field of farm price support yielded unexpected and untoward results. The federal government shortly found itself attached to the tail end of a "mighty big bar." Reference is made to the assistance rendered the cotton planter.

By means of acreage restriction, crop lending, and government purchasing we had through the period 1935-1939 given our cotton growers the benefit of higher prices than those generally prevailing in world markets. So far so good. But cotton was largely an export crop. Thus as we shored up the domestic price structure, foreign cotton captured world markets which traditionally had been ours. Overseas producers doubled their annual production while our own went ahead only about 18 per cent. Exports of United States cotton fell from an average of 8,588,000 bales in the period from 1925 to 1929 to 5,619,000 bales in the years 1935 to 1939. Meanwhile in this period of falling exports we carried over each year large supplies of cotton.

Domestic price support for a commodity moving substantially into the export market is a course of dubious wisdom. Isolationism does not pay off in economics any more than in politics. We have given the cotton farmer the assistance he asked for. But in so doing he has worsened his competitive position in world trade and Uncle Sam seems to be destined for a long career as a cotton planter.

All in all when the sum total is cast up, the agricultural segment of our economy had been taken pretty much under the protective wing of the federal government. The existence of a strong farm lobby and a farm bloc in Congress contributed no little to this result. Whenever the farmer found himself in difficulties, he called upon influential friends in the national capital. The response from Congress was usually whole-hearted. The farmer has changed his role from problem child to prodigal son.

In pursuing the other objective, the improvement of the position of labor, the New Deal was not less zealous. The first plan undertaken was perhaps the most far-reaching and ambitious of any. This was the Administration's measure, the National Industrial Recovery Act of June 1933, which delegated to the President the authority to create the National Recovery Administration—the famous NRA. It marked the extreme point of federal penetration into the industrial area. It was an uninhibited dream of government planners. As long as the American free enterprise system may endure, its beneficiaries will wish to render thanks to the United States Supreme Court for giving the *coup de grâce* to this experiment in the regimentation of business.

The measure combined ideas of emergency aid with those of social reform. In immediate purpose it was directed toward raising wages, creating more jobs, and in strengthening labor's bargaining position. To attain these objectives, the support of business was solicited by offering favorable opportunity for industrywide cooperation. The anti-trust laws were bypassed and encouragement given to concerted action which would stabilize or raise prices and wages.

Although rushed through Congress as an emergency measure, its long-range purport had perhaps even more appeal to its sponsors. In signing the law President Roosevelt stated:

"History probably will record the National Industrial Recovery Act as the most important and far-reaching legislation ever enacted by Congress.

"It represents a supreme effort to stabilize for all time the many factors which make for the prosperity of the nation and the preservation of American standards."

The National Industrial Recovery Act of 1933 was an approach to our problems of unemployment and business depression which was at once both novel and strikingly at odds with the American tradition. Although appropriating large sums for public works, the real substance of the measure lay in its industrial provisions. By these the President, as Chief Executive, was given extraordinarily broad powers with authority to delegate them. Specifically he was empowered to approve for separate industries bodies of law known as "codes of fair competition." These were to be

worked out in consultation between public officials and representative groups from various industries. For purposes of carrying out the huge task the President set up the National Recovery Administration which of course was to be under his direction. Within this bureau there were to be advisory boards representing the three main parties of interest—industry, labor, and the consumer.

Each code was to affirm what was in effect a Bill of Rights for organized labor. Workmen were to be free to organize and to engage in collective bargaining. None was to be required as a condition of employment to join a company union or refrain from joining any labor organization. Finally employers were to bind themselves to the hours of work and rates of pay determined by the President or agreed upon in consultation with officials of the NRA.

While the initiative for formulating codes rested with industry, the President had the power of promulgating them if business failed to do so. What these bodies of administrative law were to contain was vague. Basically the intention was to permit the various units of an industry to cooperate in order to eliminate disruptive price cutting, wage reductions, and damaging competitive practices. Previously such action would have been in danger of attack by the Department of Justice under our anti-trust statutes. The discretion vested in the President and thereafter delegated by him was so wide that the codes might contain rules binding upon all members of an industry as to production, standardization, prices, territories of selling, etc.

Violation of an approved code by a company within a given industry constituted unfair competition and was punishable by law. The courts, United States district attorneys, and the Federal Trade Commission were called upon to forestall violation or punish those deemed guilty.

Finally, in a provision which aroused a storm of criticism, the President was given the authority to create a license system among business concerns in an industry if he found practices being carried on which were contrary to the intent of the NIRA. This meant that the President could deny a company the right to continue doing business if he believed that it was not living up to the terms of the new Act.

In total effect this legislation was revolutionary. It reversed the age-old American philosophy of free, wide-open competition. It denied the individual businessman final determination of many questions of managerial judgment. The majority of an industry acting with government, or government alone, could restrain him as to plant expansion, plant location, and use of productive capacity. Price controls could be imposed and selling

territory limited. While he was not forced to join in code-making, he was bound by code terms and implementation.

From June, 1933, to May, 1935, monumental efforts were made to fit our economy into this strange system. Businessmen dropped productive work to swarm like bees around Washington, making codes, amending them, and interpreting their uncertain provisions. Bureaucracy grew in geometric progression.

In the end most of American business, as well as the majority of our industrial workmen, had been brought within code control. Upwards of 731 codes were established. To create and implement them the President promulgated 70 executive orders besides which administrative orders were issued to the extent of about 11,000.

After some months of experience it became clear that the controls which had been imposed were rigid and unrealistic. Accordingly many were relaxed and more freedom given looking toward increased production. Nevertheless even in its streamlined aspect it was a mechanism quite alien to the American system.

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Supreme Court Unanimously Voids N. R. A. Codes, Kills Farm Moratorium, Curbs Roosevelt's Powers

Triple Rebuff Parts Justices And New Deal	Blow Imperils Bills Pending On 'Must' List	New Deal Ends Enforcement, Asks Voluntary Observance	Part of A.A.A. Jeopardized By Decision
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A sense of relief descended upon the business community when in May, 1935, the United States Supreme Court rendered its decision in the Schechter case.⁵ In a unanimous opinion the Court held that the National Industrial Recovery Act was unconstitutional as violating the commerce clause and also in respect to the extraordinary delegation of authority by Congress to the Executive branch.

An appraisal of the results of this comprehensive effort in governmental planning will depend on one's point of view. To the more ardent New Deal planners, interested primarily in raising rates of pay and strengthening the power of organized labor, it must have seemed moderately successful. In many instances hourly wages were increased and hours of work reduced. The forty-hour week was widely established. Furthermore the imposition of the codes with their provisions strongly fostering col-

lective bargaining gave a spur to unionization. During the two years through which the NRA was operative, union membership increased by some 900,000. Offsetting these gains was the fact that real wages did not follow hourly pay increases. Prices for goods were advanced pretty much to synchronize with pay boosts.

In its aspects as a recovery measure the National Industrial Recovery Act was disappointing. It is quite probable that it worked to retard rather than accelerate the resumption of normal business. The codes with their restrictive provisions tending to perpetuate a status quo, introduced rigidity into the economic structure in place of the infinitely flexible system of unhampered private management. Rising wages, shorter hours, firmer prices, and controlled output (for some industries) in the aggregate tended to limit production of goods. Fewer goods meant less real income.

This depression-inspired, ambitious adventure although unsuccessful in the main provided valuable experience. It showed clearly that government planning of our economic lives is no simple panacea. Private management of these affairs while suffering from many defects has achieved through the years a system of very delicate and complex balance. Many of its adjustments are in the nature of an almost instantaneous reflex. Tinkering by government on a broad scale is apt to yield unpredictable results and disturb the whole mechanism.

Upon the death of the Act under judicial sentence no effort was made to revive its business recovery provisions. Immediately, however, the Administration sought to restore its labor program. In doing so there was passed one of the most controversial of our federal statutes—the Wagner National Labor Relations Act of 1935.

In brief the Wagner Act reaffirmed the right of employees to organize and to bargain collectively through representatives of their own choosing. To assure this end certain acts by employers were declared to be unfair labor practices. They must not coerce, interfere with, discriminate against employees in pursuit of the rights given them by the Act. They must bargain collectively with representatives chosen by the employees. Little was said about any rights of the employer.

Under this law the National Labor Relations Board was set up with certain administrative and judicial functions intended to implement the process of organizing and collective bargaining. It could determine the proper bargaining groups and could issue orders to cease and desist from "unfair practices."

The Wagner Act greatly strengthened the power of organized labor. Many company unions gave way to the C.I.O. and the A.F. of L. But employers were frequently confused by jurisdictional disputes between labor

groups. They were sometimes inhibited in effective bargaining by uncertainty as to what constituted unfair labor practices. They believed that the act was one-sided in failing to impose on labor correlative responsibility about unfair practices as the Railway Labor Act had done.

The Wagner Act was the keystone of the New Deal labor program. But the movement to improve the position of labor was, of course, not new. At the end of the Hoover administration there had been enacted the Norris-La Guardia Act, establishing for labor unions certain immunities from the process of injunction. In 1933 the United States Employment Service was created. Two years later the Social Security Act contained important provisions relating to unemployment insurance. Finally in 1938 there was enacted the Fair Labor Standards Act which for workers engaged in interstate commerce established minimum rates of pay and maximum hours of work.

Nor must it be forgotten that many of the states had down through these years enacted forward-looking labor legislation. Common to these were measures relating to working conditions, safety regulations, injury and unemployment insurance, as well as to problems connected with bargaining and strikes.

Viewed in its entirety all of this governmental attention marked a new era for the worker. Particularly noteworthy, of course, was the support given on the federal level. Here the power of government was placed strongly behind the cause of collective bargaining and the union movement. On an equitable basis that would have been fair enough. Unfortunately however partisanship crept into the statutes.

XLIV.

THE BIRTH OF THE FEDERAL RESERVE SYSTEM

THERE were yet other segments of the economy to feel the impact of growing federal power. Among them were the fields of banking and credit as to which controls of growing emphasis were applied. Their imposition raised vital and comprehensive issues. Thus one observes through a period of some forty years of the twentieth century a continuing difference of viewpoint between the banking community on the one hand and the federal government on the other. The former sought a system of self-regulation under moderate governmental supervision. The latter pursued authoritarian principles whereby public officials had the final word in determining policies and in making certain executive decisions. The story begins back in 1907.

As we noted in a previous chapter, the money panic of that year rudely jolted our banking system. In some states bank holidays were declared. This was all very humiliating to modern bankers who had begun to pride themselves on their accomplishments. If there is such a thing as collective shock treatment our financial leaders had been given one. Conviction began to grow that there was something awry with our banks and with our money machinery. This developed into a movement for better organization of both. Its objectives were commonly referred to as "currency reform."

A diagnosis of our ills was not difficult, particularly to those who had knowledge of foreign central banking practice. We lacked a central reserve which in time of difficulty could be put to the service of banks in need. There were some 17,000 banks in the country, each of which maintained its own separate reserve of gold and currency, part of which was often on deposit with other banks. When trouble came, each bank fought for itself, conserving and drawing in resources in a battle for survival. "Everybody will agree today that it would be difficult to imagine a banking system more cruel and more inefficient than that prevailing in the United States at the beginning of the twentieth century. . . ." ¹ Furthermore, the ab-

sence of supplementary reserves made it difficult for banks to meet variations in business requirements under what might be termed normal conditions.

Moreover there was a dangerous pyramiding of bank funds. During normal periods country banks sent substantial portions of their resources to correspondents in large cities and especially to the nation's greatest money market, New York City. The result was an overconcentration of banking funds, complicated by heavy seasonal movements. The presence of the Stock Exchange in New York gave opportunity for lending money to brokers on call. Many persons believed that this practice unduly fostered stock speculation.

Monetary difficulties were equally critical. Our currency lacked elasticity of volume to meet the fluctuating needs of business. The principal paper currency, national bank notes, were issuable only against government bonds. But the supply of bonds in the market was not always adequate at a price which paid the banks to use them for currency increases.

After the nerve-shattering experience of 1907, Congress was the first to take steps. Early in 1908 the Aldrich-Vreeland Act was passed as a temporary measure. It provided a device for issuance by the banks of emergency currency secured by certain bonds other than governments and by commercial paper, the latter to be guaranteed by regional National Currency Associations. More important, it created a National Monetary Commission for the purpose of studying banking practice in other countries. The Commission was bipartisan and composed of members of both Houses. Its chairman was Senator Nelson W. Aldrich.

The Commission went to Europe and conferred with leading bankers in London, Paris, Berlin, and Vienna. After it had submitted a lengthy report to Congress, it devolved upon Senator Aldrich to prepare a bill embodying the results of their study. This was no light task. Being a practical man, he realized that if possible it should have the support of the banking community—those who must work under its provisions. Time was also of the essence.

Accordingly it was decided that a small group would sequester themselves at a hunting lodge on remote Jekyll Island, off the coast of Georgia, and stay with the problem until agreement was reached. Those who attended were Senator Aldrich, Paul M. Warburg, Frank A. Vanderlip, as well as Henry P. Davison and Prof. A. Piatt Andrew who had served as advisors to the Commission, and the Secretary, Mr. Shelton.²

After a week of concentrated study and discussion, agreement was reached on the principal features of what was to become known in Congress as the Aldrich Plan. It was patterned somewhat after European

practice and provided for a "National Reserve Association" which would operate as one central bank at which gold reserves were to be concentrated. This bank was to have fifteen branches. An elastic note currency was proposed, based upon both gold and commercial paper. The discount rate or charge for a bank's borrowing from the Association was to be uniform for the whole country.

It was a good plan but involved the basic principle of a strong central bank under the management of bankers. Thus it ran afoul of a deep-rooted political antipathy. Congress had unceremoniously wound up the affairs of both the first and second United States Banks although each had rendered excellent service. The fear of concentration of banking resources was a political obsession. The Aldrich Plan was unfortunate enough to become an issue in the three-cornered national presidential campaign of 1912.

In this connection a story was told which subsequently gained wide credence. The Democratic National Convention of 1912 adopted a plank which registered opposition to "the Aldrich Plan *for* a central bank." When the platform itself came to be printed one little letter was dropped out which made a world of difference. The declaration then read against "the Aldrich Plan *or* a central bank." Perhaps the ghost of Andrew Jackson was on the prowl.

In any case, upon the accession of President Woodrow Wilson and the election of a Democratic Congress in 1913, the party in power felt bound by the published platform declaration against any plan involving one strong central bank. This was the death knell of the Aldrich Plan. Carter Glass, as Chairman of the House Committee on Banking and Currency, now succeeded Aldrich as congressional leader in charge of preparing the new bank law. Many proposals were considered and a host of witnesses examined. The formula which found most support on Capitol Hill was a decentralized, regional system. This involved splitting Aldrich's one central bank into twelve parts, and superimposing a governmental body to provide cohesion. It was a weak organizational concept but good politics. Such was the plan finally sponsored by the Glass Committee. Bills were submitted and, having passed both Houses of Congress, the Federal Reserve Act was signed by the President on December 23, 1913.

While Aldrich and Glass had carried the flag of banking reform in the Halls of Congress, many others had worked to bring about the accomplishment. "Individuals and associations in all parts of the country, businessmen and economists, stirred by the disaster of 1907, had struggled with the problem and, step by step, had worked their way towards a better

understanding of the great principles that would have to underlie monetary reform." ³

Among those who thus served should be mentioned H. Parker Willis, John V. Farwell, Victor Morawetz, Henry P. Davison, Frank A. Vanderlip, and Paul M. Warburg. Success in the campaign lay not alone in resolving substantive problems. It was also necessary to awaken public opinion which on such matters is notably indifferent. For this purpose there had been formed "The National Citizen's League for the Promotion of a Sound Banking System." Under the leadership of Prof. J. Laurence Laughlin, a vigorous national program was carried forward through local committees, meetings, and the dissemination of literature.

While there had been considerable unanimity for the broad objectives, nevertheless the specific issues between the Aldrich Plan and the Federal Reserve Act were sharply drawn. They disclosed a clash between basic philosophies of government. In effect it was a struggle to determine whether the new institution should be controlled by the business and banking community or by the federal government. The Aldrich Plan played down the role of government in the management of the National Reserve Association. Its directors were to be elected by the boards of the branch banks which in turn were chosen by member banks. It was a plan of self-organization and self-management. As opposed to this, under the Federal Reserve Act the federal government secured important measures of control over the new system. This was but the beginning of a long trend. Down through the years we will observe its continuance as the government's body, the Federal Reserve Board in Washington, strengthened its position and increased its power.

The Federal Reserve System, as established by the Act of 1913, was comprised of three main elements—the Federal Reserve Board in Washington; the twelve Federal Reserve Banks and their branches; and the member banks. It is important to distinguish between them because their basically different functions recurrently breed conflicts of interest.

The country was divided into twelve Federal Reserve districts with Reserve Banks located in the following cities: Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas, and San Francisco. In each of these districts the national banks, which were required to enter the system, and the state banks desiring to become members, subscribed to the stock of the respective Reserve Banks in amounts equivalent to 6 per cent of each member's capital and surplus. A portion of member banks' reserves of gold and currency was to be held in the vaults of the Reserve Banks. The percent-

age of required reserves against deposits was reduced from that formerly specified for national banks.

The new Federal Reserve Banks were separate institutions but partook of the nature of central banks. They were depositories for government funds and were empowered to issue a new national currency—Federal Reserve notes. They could lend money to the member banks and could invest their own assets in government bonds and certain eligible commercial paper. They were also to provide the country with a mechanism for clearing checks and transferring funds. Their management was autonomous and vested in boards of directors of nine members each, six of whom were elected by member banks and three named by the Federal Reserve Board. Moreover, in its desire to prevent banking interests from controlling the new Federal Reserve Banks, Congress prescribed that a majority of each Bank's board of directors should be chosen from nonbanking segments of the economy, such as manufacturing, agriculture, and commerce.

The Federal Reserve Board was composed of seven members—the Secretary of the Treasury who acted as Chairman, the Comptroller of the Currency, both serving *ex-officio*, and five others appointed by the President. It had general supervisory power over operation of the System and shared with the Reserve Banks the jurisdiction over rediscount rates, or the interest charges for advances to member banks. Furthermore the Board had power of removal over directors and officers of the Reserve Banks as well as authority to suspend the Banks themselves for violation of provisions of the Act.

The System which was thus established satisfied the principal objectives of the sponsors of the reform legislation. By pooling the resources of many banks at the twelve Federal Reserve Banks to be loaned to individual institutions where and when needed, we attained more adequate and flexible reserves. In creating a uniform paper currency which, while basically tied to gold, could be varied in amount with the fluctuating needs of business, we secured elasticity in currency supply.

This, in broad outline, was the chick which Congress and our bankers thought had been hatched. With the passage of years it was to turn into a bird of rather startling plumage. It is very much to be doubted whether the progenitors of the Federal Reserve System had any idea of the potency of the mechanism which they had created. A framework was set up for the exercise of a function which was new to the American economy. Money management came into being.

By money management is meant the over-all control of credit for the economy as a whole. It is accomplished through variation in the availability and cost of credit at the Federal Reserve Banks for use by member banks.

This in turn governs the case with which business may borrow and the relative charges it must pay for funds and thus in the end affects total demand deposits or volume of check money. Hence by these controls the money managers have, to a degree, power over the entire economy.

Many Americans do not yet realize the true extent of these extraordinary powers, or that they have been consciously employed by the Federal Reserve authorities to regulate total business volume—which of course means everybody's business. As a matter of fact even within the Federal Reserve System realization of their significance has come slowly. In consequence two divergent philosophies have been in evidence. The original one sought only to control credit in the limited sense as between each Reserve Bank and its member banks. With the gaining of experience, however, the other theory gradually developed under the leadership of the New York Reserve Bank and the Federal Reserve Board. This was the comprehensive concept in which the System as a whole undertook to control the total amount of bank credit in use as a means of accelerating or decelerating general business activity. Although this evolution was logical if we were to envisage our economy as a unit, we proceeded gropingly. The money managers themselves had to learn the business by the process of trial and error.

The growth of this over-all viewpoint stemmed from the discovery or relearning of some basic principles. First was that of the indivisibility of credit. One has frequently heard the expression "you can't earmark money." Nothing is more true, and yet it took the Federal Reserve authorities some years to apply this rule to their own operation. For example it was thought for a time that if each Reserve Bank advanced credit to member banks only for directly "constructive purposes" then, in the aggregate, the total expansion of credit might be regarded in such light.

This point of view proved to be erroneous. Take the case of a member bank which sought accommodation from a Reserve Bank upon commercial paper employed to finance a shipment of grain, a wholly constructive purpose. Actually the real occasion for the borrowing may have been that the member bank was already extending large credits to other depositors for highly speculative purposes. Once funds were placed in the member bank's account they reflected the combined or aggregate activities of that institution.

But the process does not stop with the one bank. Its depositors withdraw funds to buy goods and services or make investments, all of which results, of course, in added or new deposits in other banks. Thus the credit which the Reserve Bank made at the outset to finance the shipment of grain merges into the country's aggregate of bank demand deposits or

check money. It is like adding water to a reservoir in that the addition loses its identity and tends to raise, even though slightly, the level of the whole.

In this connection another important fact came to be realized which is vital to central bank theory but which apparently was not comprehended in its full significance by the writers of the Federal Reserve Act. There tends to be a *multiple* relationship between Federal Reserve credit and the public's check money, or bank deposits. This might be called a monetary chain reaction. Thus an increase of \$1 million in a member bank's reserve account at the Federal Reserve Bank may result in adding anywhere from \$5 million to \$7 million of check money. Similarly a decrease in reserves tends to reduce deposits by a similar multiple. The exact ratio of expansion or contraction in this mechanism depends upon prevailing reserve requirements. Moreover while contraction responds somewhat directly to these controls, experience shows that expansion depends in great measure on business confidence.

The explanation of this important phenomenon is somewhat involved but derives from two basic factors—the fluid nature of credit, and our system which requires that a bank need maintain reserves equal only to a percentage of its deposits. Thus as funds in business move from deposit in one bank through deposit accounts in a series of banks, reserves must be set aside in each bank but each receives new funds which are relendable. Hence when the Federal Reserve Banks alter the availability of Federal Reserve credit, member bank reserves may increase or decrease accordingly, a process which tends to expand or contract check money by the multiple factors previously noted.⁴

The means by which the Federal Reserve authorities exercise control over the amount of member-bank credit are not absolute in effect. They operate rather by induction and comprise three principal mechanisms. The first to be employed was that of varying the rediscount rate. Then in the early 1920's open-market operations of the Federal Reserve Banks were coordinated and given greater significance. Finally in the years of the great depression the Board was granted power to change the reserve requirements of member banks within statutory limits.

Variation of the rediscount rate was a power exercised by the Federal Reserve Banks in consultation with the Federal Reserve Board. The rate expressed the cost to a member bank of securing advances to its reserve account at its particular Federal Reserve Bank. When rates were low, member banks were stimulated to borrow and add to these balances. In turn the member banks could then increase their own loans to the business community through credits to deposit accounts. Thus the net effect

of a reduction in the rediscount rate was frequently an increase in the public's check money. On the other hand when the rediscount rate was raised the process was reversed. It should be noted, however, that a large volume of excess reserves in the banking system will tend to mitigate the effect of a change in the rediscount rate.

The second powerful tool to be employed by the Reserve authorities was that of open-market operations, which consist in the main of the purchase and sale of government securities by the Reserve Banks for their own account. In this procedure, in contradistinction to that of lending to member banks, the initiative lies in the hands of the Reserve authorities. Explanation of the workings of these operations is again an involved one. Suffice it to say that when a Reserve Bank purchases government securities in the open market, the proceeds usually find their way to some member bank in debt to the Reserve Bank and are used to reduce that debt. Conversely when Reserve Banks sell government securities, the ordinary ultimate result is an increase in member bank debt. The significance of these changes lies in their secondary effect. Traditionally commercial banks do not relish being in debt, an attitude expressive of some irony. Therefore when the debt of member banks to Reserve Banks is reduced, the officers of the former become easier of mind. They adopt more expansive policies toward business loans to customers, liberalize credit restrictions, and ease their charges. When the debt of member banks rises, the reverse is apt to happen. Operating policies become restrained, business loans are contracted, and the cost of money rises. Consequently, the end product of open-market operations will frequently be a variation in the total amount of the country's deposit or check money.

The third and last mechanism for broad control of credit is also one exercised by the Board alone, that of changing the reserve requirements of member banks. Its effect is in general similar to that of the other two procedures. By increasing the amount of reserves which a member bank must maintain at a Reserve Bank, strong restrictive pressure is applied. Member banks then tend to operate more cautiously and reduce their loans to customers. On the other hand, an easing of reserve requirements has the opposite effect and tends to expand business accommodations.

In these various ways, the Federal Reserve authorities have been given power to influence the supply of our principal currency—check money. Such variations in the amount of credit in relation to demand affect prices, production, and business psychology. In turn these contribute to prosperity or depressed conditions. This money-management is a godlike power, somewhat akin to the physicist's control over the atomic pile. One is prompted to inquire with what degree of success it has been exercised.

When the twelve new Federal Reserve Banks opened their doors in late 1914, they, like any new enterprise, were up against the problem of earning enough to meet expenses and something with which to pay dividends. Toward this end they offered member banks loans at attractive rates. At first it was hard to pick up business. They faced a "we're from Missouri" attitude on the part of business and banking. Government was more in the saddle than had been wished. Also it is recalled that the Federal Reserve Act had reduced reserve requirements. Because of war purchases by Britain and France, gold was coming to us in large quantities. There was a plethora of credit. In 1915 member banks had excess reserves of upwards of \$800 million. Not a very promising field in which to sell credit.

Our entrance into the war in 1917 changed all this. Government expenditures soared and our productive machinery was thrown into high gear. It was deemed advisable to defray only about one-third of war costs with taxes. The balance was to be supplied by an extensive resort to borrowing. This gave the Federal Reserve Banks their first opportunity to function in an important way. They were drafted to the nation's needs and served for all practical purposes as an arm of the Treasury.

The means by which government borrowed was through the sale of securities to the Federal Reserve Banks, commercial banks, and nonbanking investors. The Reserve Banks assumed direction of the bond-selling drives and acted as government fiscal agents. Most important, they made loans to member banks so that these latter might invest in government bonds or relend to the public for such purchases. Rediscount rates were held to low levels.

This process of government financing involves in reality two kinds of operations of vitally different effect. When individuals or nonbank investors buy government securities, they pay by drawing upon some existing deposit account. Treasury balances increase by like amounts. Viewed in the aggregate, total deposits of the country have neither gained nor lost.

On the other hand, when a bank subscribes to new government securities, it makes payment simply by crediting a Treasury deposit account on its books. In this manner an entirely new deposit has been created with no offsetting reduction against existing deposits. A net addition has been made in the total check money of the country. In view of the huge volume of governmental expenditures during war and heavy purchases of securities by the banks, the result is highly inflationary. Although war financing is thus made easy, the nation's economy is left with serious post war problems.

We were fortunate to have the Federal Reserve System operating during

World War I. By its aid we took the hurdles of wartime financing in our stride. Nevertheless it was found advisable to make some changes of both permanent and emergency character in our federal banking laws. To ease the over-all credit situation, reserve requirements of member banks were reduced. All their reserves were centralized in the Reserve Banks. To facilitate government financing, it was provided that banks need maintain no reserves against government deposits.

Further to channel the flow of private resources into government bond purchases, the Treasury reached out into the public-securities market. At first under the Federal Reserve Board, and then under the War Finance Corporation, there was constituted a Capital Issues Committee. Voluntary cooperation of banks and investment houses was sought to the end that no new issues of corporate securities be offered without approval of the Committee as to wartime essentiality. The plan received excellent support.

Total expenditures of the federal government for World War I were about \$34 billion. Of this sum approximately \$22 billion was provided by the sale of securities with the assistance of the Federal Reserve Banks. Depending upon maturities and conditions at time of issuance the government paid interest rates varying from 3½ to 4½ per cent. These money rates reflected a comparatively free market. While some support was given to government securities by the Treasury and the Federal Reserve Banks, the prices were not pegged. One thing which contributed substantially to relatively easy money conditions and our capacity to expand credit to take care of war needs was the heavy addition to our gold supply which occurred during the years 1915 to 1917.

THE FEDERAL RESERVE SYSTEM AND MONEY MANAGEMENT

SO MUCH for the Federal Reserve System in World War I. A good job had been done. But the matter of money management is forever bringing up new problems. Following the cessation of hostilities, the Federal Reserve authorities realized that they should take prompt steps to reduce the wartime volume of credit to the more limited needs of peacetime business. Otherwise in all probability we would be in for a further rise in prices and a speculative boom.

This situation led to a conflict of interest between government on the one hand and the Federal Reserve Banks and civilian economy on the other. The natural thing for the Federal Reserve authorities to have done when the war ended would have been to reverse the easy-money machinery, adopt restrictive policies, and raise rediscount rates. This should normally deflate credit and reduce the amount of the country's check money. It should discourage speculation.

The Treasury, however, was concerned with a different problem. It had sold a \$4.5 billion Victory Loan in early 1918 and many subscribers had borrowed money to make their purchases. An increase in Federal Reserve rediscount rates, followed by generally rising interest costs, would augment carrying charges and force the price of bonds down. The Treasury was obviously in a hot spot, and opposed a rate increase.

Although the Reserve Banks saw the wisdom of adopting deflationary measures, particularly as their own resources were nearing depletion, they reluctantly went along with the Treasury. Prompt and decisive action was deferred. Some political pressure was undoubtedly involved.

A continuance of an easy-money policy fostered what had been feared—an orgy of speculation. Prices advanced until a climax was reached in early 1920. Meanwhile, in late 1919 and the first months of 1920, the situation had become so grave that the Federal Reserve Banks had finally raised

their rates, at first moderately and then vigorously. In May of 1920 the rate became 7 per cent at the Federal Reserve Bank of New York. It was too late, however. The boom burst in mid-1920 and we experienced the most rapid decline in prices the country had ever been through.

The ensuing postwar depression of 1920-1921 was short and sharp. The speculative position was brusquely liquidated and prices restored to a saner level. An index of wholesale prices dropped from a point about 170 per cent greater than prewar to a low of something like 50 per cent above prewar. In comparing this boom and collapse with that of 1907 one experienced banker has this to say:

"The important difference between the two periods as far as money mechanism is concerned, was that in 1907 the check to over-expansion was automatic, the supply of money ran out, whereas in 1920 there was no automatic check. The reserve reservoirs of the banking system were open until the authorities made a decision about closing them. In other words, money management was substituted for automatic limitation. It also seems clear that the extreme depth of the 1921 depression is largely accounted for by the extent of the over-expansion in 1919 and 1920. If the expansion had been checked earlier the depression in all probability would have been less severe." ¹ The wartime influence of the Treasury over the Federal Reserve System had been unduly prolonged.

Ironically enough, the Federal Reserve authorities were now blamed for the collapse in prices, the penalty we had suffered for having gone on a speculative binge. Politicians throughout the country and in particular the agricultural bloc in Congress spared no words in accusing them of having brought on the depression. The force of this unreasoned outburst left the Reserve officials somewhat flabbergasted. For years to come the memory of this experience rose to haunt them.

Following this dramatic shake-out of speculation and price inflation, our economy went into new high levels of prosperity and accomplishment. Generally speaking, business was good from 1922 until the 1929 debacle. American manufactures were in demand the world over. Exports exceeded imports by large figures and gold flowed to us in an abundant stream. Production mounted and wages were high. There was only one ominous cloud. Agriculture came upon lean times as our farm products encountered more vigorous competition in world markets.

In the recovery which was under way by the beginning of 1922, some observers credit the Federal Reserve Banks with an unwitting "assist" as well as the inauguration of a significant new policy. Because of the drastic liquidation which was taking place, some of the Reserve Banks found themselves lending little if any money and thus not earning enough to pay

expenses. To remedy this, these Banks, acting separately, invested heavily in government securities purchased in the open market. This move helped member banks in further reducing their loans at the Reserve Banks and put the former in a position to adopt a more liberal attitude in accommodating the needs of trade. Shortly thereafter business recovery had impressively advanced, a result which experienced observers connected directly with the investment by Reserve Banks in government bonds. For all practical purposes, this was the inception of open-market operations as an instrument of money management in the United States.

The next five years (1922-1928) were productive for the Federal Reserve System. To the prewar concept of serving the occasional needs of separate member banks was now added the much broader horizon of overall credit management. It was a thrilling and challenging adventure. Furthermore it seemed to be one of more than moderate success. The machinery of money management appeared to be responding sensitively to the intentions of the men at the throttle. Particularly were the authorities impressed with the efficacy of their recently discovered open-market operations. So during this period we find them favoring this new tool but usually employing it in conjunction with the older one—variations in the rediscount rate.

In late 1922 and early 1923, the acceleration of recovery seemed overly rapid, so the Reserve authorities put on the brakes by selling securities in the open market and by raising rediscount rates. Production slowed down and general business began to decline. Accordingly restrictive policies were reversed in 1924 when securities were purchased and rates lowered. This changed conditions and business volume once more resumed its upward trend. Then in 1925 and 1926 the force of the forward movement was slowed down by moderate sales of securities and slight rate increases. In 1927, production volume suddenly turned downward. This factor, coupled with the difficulties of certain European nations in maintaining the gold standard, caused the Reserve Banks to purchase securities and ease rates. This had the effect of reversing the down trend of business and a strong upward movement was started, due to carry on until the crash of 1929.

On the record it began to look as though open-market operations were something to conjure with. It is not surprising therefore to find the Federal Reserve Board in Washington reaching out to grasp this new magic wand with unmistakable firmness. The first open-market purchases in 1922 had been made by a few separate Reserve Banks. Within several months they had organized a committee to execute purchases and sales through a common channel. Then in October of that year an important evolution took

place when this committee was authorized to make policy recommendations.

The workings of the new procedure were now beginning to assume aspects of national implication. In 1923 the Federal Reserve Board moved in. It took over in the name of the System the informal committee which a few Reserve Banks had set up and clothed it with the aura of Board authority. Then for all twelve Reserve Banks there was created a centralized open-market account in which each Bank had an interest. Thereafter the principal open-market operations of the System were conducted through this channel. No one Bank could be committed without its consent. "Thus every open-market operation of any consequence from 1923 to early 1936 received the definite approval of the Federal Reserve Board and was subject to the choice of each Reserve Bank as to its participation."²

If open-market operations were anywhere near as effective over general credit conditions as the authorities supposed, the situation undoubtedly called for centralized administration. Thus through the early 1930's we observe a crystalization of power in the Board and a corresponding diminution of autonomy on the part of the Reserve Banks. Finally the Open-Market Committee received statutory recognition and in the Banking Act of 1935 took the form in which we know it today. It was made up of the seven members of the Board of Governors and five representatives of the Reserve Banks, thus vesting the Board with effective control. Power over open-market operations is absolute and the separate Reserve Banks are bound by its determinations.

While the Reserve authorities were thus having an absorbing adventure at home in the development and application of policies of money management, events on the international scene were equally stimulating. Led by the Federal Reserve Bank of New York, our officials essayed a major role in the attempt to stabilize foreign currencies as part of the broad program of the postwar rehabilitation of Europe.

This effort reflected a feeling common to many American businessmen that our own interests would best be served by assuming responsibilities in the world economic order. It was hoped to get trade moving freely once more. To accomplish this it was essential that the existing rapid fluctuations in exchange and wide disparities between currencies be removed. The most practical means for creating a stable exchangeability of funds was a return to the gold standard from which the war had caused many nations to depart. Accordingly one country after another restored its currency to a gold basis under controls imposed by existing or newly formed central banking institutions.

In carrying out these broad purposes it was quite natural that the lead-

ing central banks should work together. Hence we find officials of the Federal Reserve Bank of New York acting in concert with their opposite numbers from the Bank of England, Bank of France, and the Reichsbank. Just as at home the Federal Reserve System was meeting with great favor, so on the world scene central banks were having a big play. It was their Golden Age.

Each year from 1924 to 1928 inclusive saw the return to gold of European powers—Germany, England, Belgium, Italy, and France. In this broad movement to stabilize the currencies important to world trade, our Federal Reserve Banks endeavored to cooperate. At one time or another we established gold credits in favor of the central banks of England, Belgium, Poland, Italy, and Roumania. These credits were not always used. Their mere existence served in an effective way. It was notice to the world that the huge resources of the Federal Reserve System were in some degree pledged to support the new monetary plans.

The general terms of the arrangement with the Bank of England are of interest. In 1925 the Federal Reserve Bank of New York, acting for the System, agreed for a period of two years to sell gold to the Bank of England in amounts which at any one time would not exceed \$200 million. Such gold was to be paid for by a credit in sterling on the books of the Bank of England. Interest was to accrue only on sums used, at rates which in general were to be 1 per cent above the rediscount rate in New York. None of this credit was drawn upon.

To make these heavy commitments in gold was quite within our means. This was due to a factor which had a bearing of immense significance not only upon our own economy but also upon that of other leading nations. We were inundated with gold. Just a scant thirty years before, Grover Cleveland and J. Pierpont Morgan had fought a memorable battle to prevent the country from ignominiously going off gold. Now we were suffering from an embarrassment of riches. Our monetary gold stocks grew from slightly more than \$2.5 billion in 1920 to a plateau of about \$4.2 billion in the years from 1924 to 1927. This was a lot of yellow metal. It meant even more as a credit potential, since imports of the precious metal were monetized and permitted to swell the reserves of the banking system.

This turn of events raised difficult and far-reaching problems. As other nations lost gold and we gained, they faced deflationary tendencies and we were confronted with inflationary ones. Such excessive movements helped no one. If we wanted to assist in the economic rehabilitation of Europe it was important to control them. Hence our newly enthroned money managers found themselves vitally concerned with international gold movements.

The situation was quite baffling. We wanted to diminish the influx of gold. The traditional method of accomplishing this was to maintain low rediscount rates here as compared to higher ones in Europe, thus creating in this country a less profitable outlet for foreign investments. However the easing of our money rates carried inflationary implications in the potential expansion of member-bank credit. On the other hand high rates in this country would tend to attract more gold, and more gold was undoubtedly inflationary.

In consequence, our monetary pilots were between the devil and the deep sea. They chose the pursuit of easy-money policies here with the hope that gold stocks in Europe would increase and deflationary tendencies there would be reduced. This led to a step in 1927 which at the time and ever since has been the subject of keen controversy. With a desire to help England in particular, our rediscount rate was lowered to $3\frac{1}{2}$ per cent. "This plan was entirely justified, not only as a duty towards our neighbors, but as a matter of self interest--provided the System was prepared boldly to reverse this policy as soon as it might become evident that excessive ease of money was exercising an inflationary effect, or that it was over-stimulating speculation. Unmistakable symptoms of such adverse effects became evident at the end of 1927."^a

The machinery of money management worked all right in changing the gold movement. We lost some \$500 million in a twelve-month period beginning in late 1927. Then an interesting thing happened. The mechanism when put into reverse ceased to function as it had done in the mellow years of 1922 to 1927.

As the year 1928 opened, our Reserve authorities saw that their easy-money policies were contributing to a condition of inflation and speculation. The pitfall they feared was now a definite threat. A growing amount of credit was being diverted to speculative purposes--notably into securities and real estate. With the idea of slowing down this speculative trend, the Reserve Banks raised rediscount rates. Between January and July, 1928, the rate at the New York Bank was raised three times, going from $3\frac{1}{2}$ to 5 per cent. Heavy open-market operations were simultaneously undertaken until almost all of the Reserve Banks' securities had been sold.

This was moderately vigorous action but proved of only indifferent and temporary success. It might have been carried further but for an unfortunate development. A sharp difference of opinion occurred between the Federal Reserve Board in Washington and the Reserve Banks. The former, perhaps reflecting political pressure, opposed additional increases to the rediscount rate. It claimed that such action would penalize legitimate business and advocated that Reserve Banks discourage speculation by a

qualitative determination of the credit extended to member banks, coupled with "moral suasion." The Reserve Banks, on the other hand, being closer to the realities of the business world, knew that credit could not be earmarked and favored the positive action of making it increasingly more costly.

Thus under conditions of indecision as to monetary policies, the speculative frenzy resumed its course, sweeping all before it. From mid-1928 stock prices skyrocketed upward in a dizzy spiral, supported by an inordinate expansion of bank credit. Finally in August of 1929, the Reserve Board changed its position and approved a further increase in the rediscount rate. Thereupon the New York Reserve Bank announced a rate of 6 per cent. This action came too late, as speculation had already reached a climax. In September the boom in stock prices burst with disastrous consequences. The stock-exchange panic which ensued ushered in the great depression.

On the surface it appeared that money management had failed dismally. A mountain of credit had been put to speculative abuse. Rarely, if ever, had our economy got into such a mess. Yet never before had it been the object of such planned controls. With all of this studied direction, how was it that experienced businessmen failed correctly to appraise the highly explosive situation which had been built up? While some officials of the Federal Reserve Banks and others sensed the imminence of danger there was no real appreciation of its devastating possibilities.

In hindsight we enjoy a perspective not available during those electric times. There were without doubt some storm signals flying. The difficulty lay, as always, not so much in detecting them but in evaluating them. We relied too much on barometers which registered fair and too little on those instruments which indicated trouble ahead.

Contributing to an optimistic complacency in our outlook was the fact that since 1922 business had been good—perhaps just a little too good. National income rose without recession from \$60.7 billion in 1922 to some \$81.6 billion in 1926. Wage rates forged ahead but prices in general increased only moderately so that real wages registered an advance. Labor seemed comparatively content in that the number of workers involved in strikes went down from 1,612,000 in 1922 to 329,000 in 1927. Savings deposits jumped from about \$17 billion in 1922 to \$26 billion in 1927. Net income of manufacturing corporations was \$3.7 billion in 1926 as compared to \$2.6 billion in 1922. Reflecting all these favorable aspects, prices for industrial stocks advanced from an index of 58.4 per cent in 1922 to 107 per cent in 1927.

Thus as our businessmen and economists observed the usual recording

instruments, they found little evidence of impending trouble. One of our great difficulties in detecting the onset of a boom-bust sequence is that we expect the next one to be like the last. Accordingly, in the three years preceding 1929, we looked for trouble in the direction from which it had come in 1919-1920, skyrocketing commodity prices, high inventories, and strained bank credit. But as none of these things was present it was easy to conclude that all was well.

Unfortunately, however, in taking economic observations we passed rather casually over certain factors which in retrospect should have given concern. There was the matter of a rapid growth in our stock of monetary gold which increased by some 60 per cent between 1920 and 1924. This was piled upon the heavy accretion of the years 1915-1917 so that in the period 1924 to 1927 we had in the neighborhood of 2½ to 2¾ times as much monetary gold as we had in 1914. By all the economic laws of the Medes and the Persians, this growing mountain of gold, because of its credit potentials, should have brought with it a condition of inflation.

When this did not occur at once we were thrown off guard. In our exuberant "New Era" philosophy we concluded that the American economy had changed and that the old laws were no longer working. Actually they were—only with delayed effect. The influx of gold (1920-1924) came when the member banks were in debt to the Reserve Banks, and the reserves thus acquired were used to retire the debt. Accordingly there was a lag, or a condition of creeping inflation. In the end the old principle took hold. As the member banks paid off their loans at the Federal Reserve Banks, they were placed in a position and frame of mind to lend more freely to their customers.

The powder train from that point to a condition of intense speculation was set off by the move of our money managers in 1927, reducing the cost of credit. This act induced commercial banks to deal even more liberally with customers. To provide added loanable funds, member banks doubled their own borrowings from the Reserve Banks between 1927 and 1929. Irrespective of the purpose for which originally created, credit flows ultimately to rising markets. Hence in the years 1927 to 1929, the bulk went into speculation in stocks and real estate.

The full degree of this inflation was not disclosed by the absolute amount of credit outstanding. Many people overlooked another factor. We were employing credit more actively. Check money was moving in and out of deposit accounts with considerably more rapidity in 1929 than in 1924. The situation was particularly marked in New York where the annual turnover of deposits at reporting member banks jumped from a rate of 56.8 in 1924 to 99.5 in 1929.

But it was not so much the direct lending by the commercial banks which carried speculation into its final dizzy spiral. It was rather a somewhat unusual type, which our money managers and banks failed to control and which the banks were later prohibited from engaging in by the Banking Act of 1933. These were loans made by banks under instructions from customers and out of the latter's own funds. Taking advantage of the mad desire of speculators to borrow at almost any cost, corporations and individuals advanced large sums to be loaned in the securities markets at high interest rates. These "loans for the account of others" ballooned from about \$2.7 billion at the beginning of 1927 to roughly \$6.5 billion in late 1929. Thus one section of our people, engaged in abnormal lending, piped the credit music for the whirling death dance of another section—the heavily borrowing stock gamblers.

The mania for security speculation brought high activity in new-capital issues. Corporation and financial interests carried away by the New Era philosophy planned expansively and spent accordingly. New issues of common stocks jumped from about \$42 million in 1924 to \$371 million in 1929.

Two developments in this field of finance were particularly striking. The public utility holding company and the investment trust came in for much attention and provided the means for assembling aggregations of capital. The former device was not new. For some years holding companies had been expanding as the more ambitious and successful utility operators sought ever-growing opportunity for investment. This period saw them at the zenith of their power. Favored by keen public interest in their securities, these holding company officials floated big capital issues and with the proceeds bought control of innumerable local utility operating companies. The economic justification was that strong financial support, coupled with centralized management and engineering, brought to the local companies facilities beyond their reach as separate entities. This concept was sound. The holding company movement served greatly to accelerate the progress of the public utility industry. Unfortunately, however, it was the type of financial mechanism which lent itself to abuse under the direction of unprincipled operators. That there was such abuse in important quarters cannot be denied.

The investment trust was something new on the American scene and perhaps more than anything else characterized the boom period. In England and Scotland it was a venerable and respected institution. The idea was that men experienced in financial matters could manage capital with greater success than the average person. Although our securities men and bankers had been investing funds for others down through the years,

the investment trust formula impressed us as a great discovery. Favored by the vigorously rising stock markets of 1922-1929, some of our financial interests found it easy to convince themselves and others that they were endowed with unusual prescience not only in managing investment funds but speculative ones as well.

When these ideas struck us in the expansive atmosphere of the New Era, the American people went overboard in one of the nation's most hectic financial adventures. Hundreds of millions of capital were poured into newly organized investment trusts. Large ones were formed by important financial houses. Small ones were formed by Tom, Dick, and Harry in cities all over the country. Some were dedicated to investment, others to outright stock gambling. For a while the public was so avid for these securities that new offerings were at once bid up to a premium. Investors were carried away with the idea that the managers of the leading trusts possessed a Midas touch.

When the speculative bubble burst in September, 1929, stocks tumbled from their dizzy heights, as sudden converts from the New Era philosophy rushed to sell their holdings. Loans were called and more stocks dumped on an already overwhelmed market. The mechanism of the New York Stock Exchange was unable to keep up with the volume of business and frequently the stock ticker was an hour or so behind actual transactions. Literally billions were wiped off stock values. Paper profits vanished more quickly than the pea in a shell game. Thousands of our countrymen lost their initial stakes or woke up with loans they could not repay.

The stock crisis immediately produced a monetary one. The amateur lenders of funds, who had added the most devastating fuel to the speculative conflagration, now began to run for cover. As prices fell, loans were called and as loans were called prices plunged further. The old vicious circle. It will be recalled that the member banks were heavily in debt at the Reserve Banks. In order to permit member banks to substitute new loans for those being called and to ease the situation by a reduction of member-bank borrowings, the Federal Reserve Banks acted promptly. Without taking time to consult the Open Market Committee, the Federal Reserve Bank of New York began buying government securities. Others followed. This initiated the most prolonged and ambitious open-market operation of the Federal Reserve System. It was at once effective and, by early 1930, member banks were largely out of debt. The situation was easier and stock prices staged a rally. This proved to be a false recovery. Thereafter the downtrend of security prices was resumed and served to register a general collapse of the nation's economy.

XLVI.

THE GREAT DEPRESSION

It would be wrong to conclude that the great depression into which we had been projected was solely the outcome of stock speculation or the result of the Federal Reserve's easy-money policy of 1927. We, like other nations, were being tossed about by forces stemming from World War I. The economic disturbance was in the nature of a global cataclysm due in great measure to the maladjustments of international trade, currency problems, government debts, and political difficulties left as an aftermath to that military conflict.

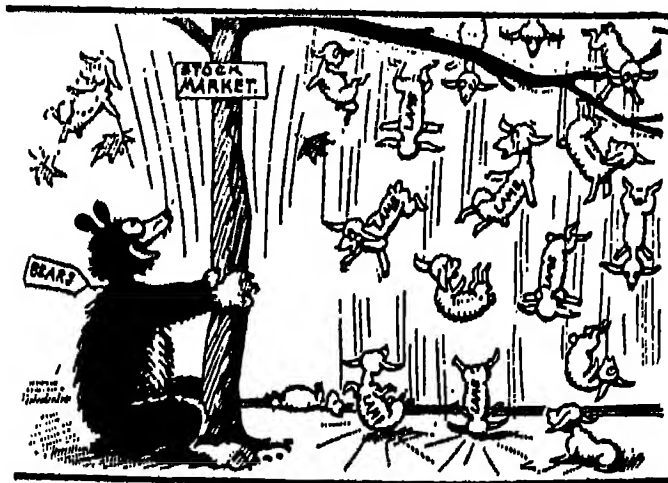
This was made graphic by the events of 1931. Once again we were to see illustrated the basic principle of the One-Worldness of commerce. In May of that year, a venerable banking institution of central Europe, the Credit-Anstalt of Vienna, closed its doors. Immediately the shock was felt in Berlin because of the intimate trade ties between the two nations. Except for the Reichsbank, all the great Berlin banks suspended and as far as Germany was concerned the gold standard became one in name only.

Then this earth tremor moved across the Channel, because English banks had large credits outstanding in Germany. An international run on sterling balances ensued, and by early fall the English institutions were making very heavy weather of it. Finally England, that great Merchant Prince of nations, was forced off gold. Various other countries followed. Thus as we entered 1932, it seemed that there had gone to smash throughout Europe most of the delicate structure which our Federal Reserve and other central banks had so carefully built with the hope of giving world trade more freely convertible currencies.

In the face of this widespread need for more of the yellow metal New York became a focal point of pressure. From all over the world demands converged on our large banks, and gold began moving outward in a veritable flood. Between September, 1931, and June, 1932, we lost upwards of one billion dollars.

These untoward developments put our banking system under severe

strain. The Reserve Banks had tried without avail to stem the lighted powder train in Europe by making limited credits to central banks. Then, as the run on American gold gathered force, our credit situation deteriorated disastrously. As gold was withdrawn for export our member banks were forced to procure large advances from the Reserve Banks and concurrently proceeded to put heavy pressure upon their borrowing clients for payment. Thus the farmer in Iowa, when called up by his local bank, might have traced the sequence of events back to the failure of the Credit-



Copyright by the New York American

See Them Drop
—Powers in the New York "American."

This cartoon brought wry smiles in the blue days of the Great Depression. Millions of Americans could be classed as "lamb"

Literary Digest, January 2, 1932

Anstalt in Vienna, and to the more basic cause that World War I had undermined the international economic order.

For us, as well as for other nations, the principal low of the deflationary process came in mid-1932, although to some extent it was continued in the following year. Prices dropped sickeningly until wholesale commodity prices were off about one-third and farm prices down over 54 per cent. Our national income plummeted to \$43 billion in 1932 as compared to the high of \$87.2 billion in 1929. Industrial production dropped to an index of 58 per cent from 110 per cent. The farmer was in a particularly bad way as agricultural income fell from \$8.7 billion in 1929 to about \$3 billion in 1932. Worse than that however was the fact that the prices he received de-

clined more rapidly than his expenses. The number of unemployed throughout the whole economy grew alarmingly and in 1933 was estimated to be around 15 million.¹

This worldwide deflationary squeeze was pretty grim. Of the great powers, France and the United States were the only ones still on a full gold standard in 1932. Strong as we were, we found the going rough indeed. The most serious trouble was with our banking system. As prices continuously receded and pressure of liquidation increased, small banks all over the country began to fold up. Then word spread that some of the larger institutions were in trouble. With all the other gloom which prevailed, the atmosphere was ripe for developing a mob fear-complex. It was not long in coming. A growing distrust of banks spread through the nation. People withdrew currency for hoarding, thus creating new pressure on the already weakened financial institutions.

This run on our banking system became marked in late 1931 following the banking collapse in Europe and the huge outflow of our gold. It continued throughout 1932. Our money managers, the Federal Reserve authorities, found themselves overwhelmed and unable to stem the movement. Discount rates were reduced and open-market operations resumed on a large scale. In spite of these heroic efforts, liquidation proceeded with no appreciable letup in bank failures.

Things went from bad to worse. Finally Congress was forced to take action. In early 1932, the Reconstruction Finance Corporation was organized to make emergency advances principally to banks and railroads with the hope of stemming the tide of failures and of stopping the spread of panic. At the same time operations of the Federal Reserve Banks were broadened.

For a time it seemed that order was being restored. The outflow of gold was stopped. Member bank indebtedness was reduced to a low figure. Pressure of credit liquidation was eased. Unfortunately this was the calm which preceded the renewal of the hurricane.

As we approached the end of that disastrous year of 1932, people's nerves were still on edge. Agriculture, business, and banking had taken a lot of punishment. A new Administration was coming into power. Traditionally the Democrats were associated with attitudes unfavorable to stable business. The atmosphere was pregnant with uncertainty.

Into this highly explosive situation Congress tossed a match which many blame for the renewal of the banking panic. Congress insisted that the Reconstruction Finance Corporation make public the names of the banks or companies which had been given financial assistance. The list was extensive and made disturbing reading.

Although bank failures continued during the first few weeks of 1933, there was still no particular indication that the financial situation would disintegrate completely. Then suddenly in mid-February, the Governor of Michigan stunned the country with the declaration of an eight-day bank holiday for banks of that state. This started the house of cards crumbling. Panic not only spread, it seemed to explode. Other states took similar action and when Franklin D. Roosevelt assumed office on March the fourth, only a few of the strongest banks remained open. The almost incredible had happened. The banking system, upon which we had built such hopes under the direction of the Federal Reserve money-managers, was near collapse. Much to our chagrin this was a greater catastrophe than that of 1907, 1893, or even 1873. To find any parallel one must go back to the days of primitive banking before the Civil War when we had the benefit of neither the Federal Reserve System nor the National Banking Act.

As President Roosevelt assumed the reins of government, economic conditions were indeed chaotic. Unfortunately he had declined a proposal of the outgoing Chief Executive, Herbert Hoover, for cooperative effort during the hectic weeks immediately preceding the inauguration. Once installed, however, Roosevelt acted with admirable courage and vigor.

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 SATURDAY, MARCH 4, 1933
 Vol. 41, No. 1, 22

Roosevelt Shuts Banks 4 Days, Bans Hoarding, Embargoes Gold, Authorizes Nation-Wide Scrip

Hilerites Capture Reichstag Control
 With Record Vote

New Money
 Here Awaits
 Capital Word

Congress Set
 For Thursday
 In Call to Act

Facing the banking panic resolutely, he immediately declared a bank holiday for the nation. He urged upon Congress measures to relieve the crisis. Roosevelt's own display of confidence did much to allay alarm. His declaration, "The only thing we have to fear, is fear itself," was stirring rhetoric and an effective slogan for reactivating faith in our institutions.

Operations by our banks were not absolutely suspended in that small withdrawals in cash were in some cases permitted for payrolls and essential living expenses. The holiday served to allow time for the authorities to make a quick check to determine which institutions were inherently sound. It also gave our people an opportunity to recover their composure.

After some ten days' breathing spell, most of the banks reopened—some 13,000 in number. About one-quarter remained closed, tying up deposits of around \$4 billion. Hoarding ceased and much of the currency which had been put into safe-deposit boxes by timorous citizens came back to the banks.

Thenceforward the situation improved quickly. The banking crisis had been weathered. Nevertheless the experience, coupled with depressed conditions of business, had shaken our economy to its foundation. The Roosevelt administration set itself to apply measures of recovery. Concurrently and with even more diligence, it pursued policies of reform and long-range social objective.

Considering the urgency of our difficulties, many persons felt that recovery should have been given a clear priority; that preeminently what was needed in the first instance was to restore the economy to a condition of health. This difference in viewpoint found the New Deal and the business community working at cross purposes. There developed an atmosphere of mutual distrust. Reacting to this, and impatient with the slow normal processes of recovery, the Administration pressed for deeper governmental penetration into the economic order. Increased federal regulation and far-reaching controls became fixed principles of the New Deal.

Thus in the next few years the fields of money and banking came in for quite a going-over. Between 1933 and 1935 important changes were made. While the money managers of the Federal Reserve System were permitted to carry on their usual functions, the New Deal attempted some broad reforms and startling innovations.

In net result governmental bodies, the Treasury and the Federal Reserve Board, gained in power. At the outset, acting under congressional authority, the Treasury expropriated or called in all monetary gold and bullion. Provision was made for withdrawing gold certificates from circulation. Brusquely thrown overboard was the traditional principle of the gold convertibility of our currency for which we had fought so desperately from 1870 to 1900. With the Treasury thus in actual custody of our gold, the situation was something akin to the Independent Treasury system which had prevailed from before the Civil War down to the adoption of the Federal Reserve Act.

Then in January, 1934, with the passage of the Gold Reserve Act, the New Deal undertook one of the most adventurous economic experiments ever attempted by our government. This was prompted by the search to find some quick and easy road to recovery. The dollar was devalued in terms of gold. By so doing it was hoped to raise the general level of prices and get business going in greater volume. The idea of being able to decree

a condition of recovery by saying "Lo, let there be higher prices!" was a thought which had strong appeal to some of the President's advisors.

Acting with Congressional authority, the President announced that thenceforward the Treasury would pay \$35 an ounce for gold instead of the former price of \$20.67. Giving effect to this change there was an increase in the dollar value of gold held by the Treasury—a gain of some \$2.8 billion. This was to be used by the President and the Secretary of the Treasury in stabilizing the new dollar in foreign exchange and in fostering an improved domestic currency situation.

As to the main objective of this ambitious experiment in currency tinkering, a broad rise in the price level, it cannot be said that any impressive success was attained. The scheme was no doubt disappointing to its sponsors. While prices subsequently moved up slightly, there were other forces at work. Moreover the possibility of further devaluation was definitely disturbing to business confidence.

The Administration pressed forward with its measures for reform, and legislation was passed separating the functions of commercial and investment banking. Restrictions were imposed on the extension of credit in the fields of securities, commodities, and real estate. Finally, a comprehensive system of insuring bank deposits was inaugurated. All member banks were required to join the Federal Deposit Insurance Corporation, and other financial institutions given the opportunity to become members. Bank deposits were guaranteed up to a sum of \$5000 for any one depositor. In this general overhaul of the banking and monetary systems, the Federal Reserve Board, in reality an agency of the government, emerged with enhanced authority and a new name—the Board of Governors of the Federal Reserve System.

Meanwhile, as we have noted in a previous chapter, the New Deal was vigorously pushing its program in other areas. To improve the position of the farmer and organized labor important laws were enacted. Notable among these was the National Industrial Recovery Act passed in 1933. It was an ambitious attempt to raise wages by stabilizing competitive conditions in our many industries. Following its application through the National Recovery Administration (NRA), there was a slight improvement in business, which petered out in 1934.

Nor did money management as exercised by the Federal Reserve authorities appear more successful. Credit was cheap and plentiful but found few takers. Confidence was lacking. Businessmen will not borrow to expand operations unless they can look forward to reasonably predictable future conditions and opportunities for profit. The New Deal negated

such outlook by its experimentalism and apparent lack of understanding of the practical needs of our economy.

After the NRA was declared unconstitutional in May of 1935, business picked up and an impressive swing of recovery seemed under way. This encouraging trend was accelerated in 1936 by an inflationary act of government. A \$2 billion soldiers' bonus was distributed. Recovery became even more impressive and attained a high rate in the first part of 1937. Prices were mounting, and confidence improving. The thing that the Administration was striving for seemed here. The situation, however, brought no peace of mind. The Administration and our money managers were suddenly seized with a new worry. They had fed the patient so much stimulant that they now became concerned lest he had gone off on a binge. Could it be that recovery had turned into a dangerously inflationary spiral? Fresh in memory were the mistakes of 1927-1929. It was decided to apply the brakes.

This gave the money managers an opportunity to use for the first time the powerful new tool which had been accorded them under the New Deal banking legislation. Reserve requirements of member banks were increased three times between August of 1936 and May of 1937. This procedure is designed to make credit relatively scarce. The older mechanism, that of varying the rediscount rate, obviously seeks directly to control the price of credit. In conjunction with the increase of member-bank reserve requirements, gold was sterilized and the Administration warned that some prices were dangerously high.

These measures took hold more quickly than had been expected. From the high in 1937 to the low of 1938 commodity prices fell from an index of 86 to 78 per cent; industrial production from 113 to 89 per cent; and stock prices from 118 to 90 per cent. While the imposition of credit restrictions was accepted by many as the proximate cause of business reversal, there were various factors which made the economy vulnerable. Among them were the lag in the recovery of durable goods industries, spiraling costs of manufacturing, and relapse in the rate of government disbursements.

An outstanding characteristic of these years was the renewal in even greater force of the influx of gold. When in 1934 the dollar was devalued and the Treasury started paying \$35 per ounce for gold, the yellow metal was attracted to us like steel to a magnet. From a monetary stock at the end of 1934 of \$8.2 billion, our supplies jumped to \$14.5 billion at the end of 1938. Then the movement became accelerated by the flight of capital from Europe and the purchase of munitions in this country as World War II grew from threat to reality. At the end of 1941 our monetary gold

stock amounted to \$22.7 billions, or upwards of 70 per cent of the estimated world's total. After allowing for devaluation in 1934, this was about eight times the supply we possessed at the outbreak of the first world war.

Whether the New Deal would ever have succeeded in its goal of giving our people satisfactory and stabilized economic conditions will never be known. It was rescued from the embarrassment of a final accounting by the impact of war. However, the results of eight years' effort and huge outlays for relief and pump-priming were not impressive. At the end of 1940 it was estimated we still had some eight million unemployed.

But even that year had realized sizable war orders for our plants as England and France rushed to anticipate their needs for munitions. Thereafter the pattern of events repeated that of the first war. Gradually we became more involved and slowly war conditions infiltrated our economy. This gave us a breathing spell in which to prepare ourselves before we engaged in the war on a shooting basis.

XLVII.

BUSINESS GOES TO WAR

World War I

OUR free enterprise system has been distinguished for two principal accomplishments. It has enabled us to maintain a rising standard of living. Beyond that it has provided us with the means of warding off the armed threats of aggressor nations which might have made us a subject people. Freedom has engendered not only the will but the capacity to remain free. Similarly by this same strength we have assisted other like-minded people to retain their liberties.

The waging of modern warfare requires the existence of a highly integrated system of production machinery and transportation facilities. In themselves however these things are barren. The activating element is the skill required to operate them. It is this "know-how" of industrial production which is essential to the attainment of military victory.

That we possessed these abilities may be attributed to a system of government which left business relatively free to pursue courses of its own determining for the purpose of making profits. Our people were favored with a political environment conducive to chance-taking and the development of a multitude of small enterprises. Moreover there was wide opportunity for the fittest of these to expand. Business was permitted to develop and become big.

These policies paid off well. A myriad of little plants throughout the country gave us abundant resources in trained men and facilities. Particularly important was the contribution of our large companies. The experience gained in the quantity production of peacetime goods enabled us to meet the extraordinary necessities of our armed forces. When the pressure for vast supplies of armament became most urgent we turned to great concerns like Ford, General Motors, United States Steel, General Electric, Westinghouse, Standard Oil, and a host of others.

This American system, however, suffers from the defects of its qualities. Both government and business are slow to become aroused to the threat of war. Moreover we are awkward in the transition from the liberties of a peace economy to the authoritarian controls involved in armed conflict. As a democratic people public opinion directs our policies.

But once committed to war this free system's response fulfills the highest expectations. Although at first mobilization is slow and bungling, in the end a coordination of effort is achieved that is more effective than those of totalitarian governments. Superior power derives from the fact that our people have been trained in self-reliance and resourcefulness through the play of a competitive economy. Thus in two great world wars the American system has out-invented, out-planned, out-produced, and out-fought the most powerful aggressor nations. Not always did we get there "fustest" but before the final bell we got there abundantly with the "mostest."

It is common to speak of government's direction of war production. This is, in a way, misleading. While the center of the vast web of organization has been the federal capital, the actual management of this phase of the war effort in both world wars has been in the hands of businessmen. They have convened in Washington during the emergencies to plan, coordinate, and carry out the huge programs for meeting the needs of the military. For the most part these were voluntary acts of self-organization by those called upon to produce the weapons of war.

Our entrance into World War I as a shooting combatant in April, 1917, followed a period of warning and threat during most of which our people were torn by two divergent schools of thought. One saw war for us as more than probable and urged strenuous rearmament. Campaigning vigorously for this course was ex-President Theodore Roosevelt. He struck the keynote for his side when he declared, "To an infinitely greater degree than ever before, the outcome depends upon long preparation in advance, and upon the skillful and unified use of the nation's entire social and industrial no less than military power."¹

On the other side were a great body of public opinion and leading members of government who sincerely believed that we could avoid involvement in the European conflict. Most influential of these was President Woodrow Wilson who had once made the unfortunate remark about a people "being too proud to fight." His supporters in the campaign of 1916 urged his reelection on the ground that he had kept us out of war.

The basic premise upon which this second group depended was that the mere possession of armament tended to foment war. They opposed our preparing for eventualities because they argued that such a course would either invite attack by Germany or as a nation we would become

"trigger happy." This point of view was activated by widespread propaganda of peace societies advocating disarmament. They refused to recognize that aggression was still a force in world affairs and that the possession of arms was a means of defense and of discouraging predatory warfare.

Thus the Wilson Administration and Congress followed a policy of postponing important steps toward preparedness. During long months in 1914, 1915, and most of 1916, while England and France poured out their heart's blood to hold the Hun, little was done toward getting ourselves ready for active warfare. Nevertheless there was mounting unrest about "peace at any price." Some constructive moves had been undertaken.

Among these were our first steps toward industrial mobilization. Congress had authorized an ambitious program of naval construction. For assistance in carrying this out there had been appointed the Naval Consulting Board. It was composed of representatives of leading scientific societies under the chairmanship of Thomas A. Edison.

This board, knowing that production was the key to successful modern war, turned to experienced manufacturers for assistance and formed the Industrial Preparedness Committee. Financed largely by businessmen, this new group undertook to compile a list of our manufacturing plants adaptable to war work. But it did something even more important. Sparked by the driving energy of its chairman, Howard E. Coffin of the Hudson Motor Company, Detroit, it performed what was in effect a Paul Revere's Ride for industrial preparedness. Through a national organization of state committees and with excellent newspaper support, businessmen were rallied to the cause. "To Mr. Coffin, more than any other individual, is due the evocation of the pre-war movement for industrial preparedness, so far as its popular aspect was concerned."² By the fall of 1916 facilities reports had been secured from twenty thousand plants throughout the country.

Meanwhile the government had become further aroused. The Army Appropriations Act was passed in August, 1916. Among other things provision was made for the creation of a Council of National Defense to be composed of six Cabinet members: the Secretaries of War, Navy, Interior, Agriculture, Commerce, and Labor. This reflected the new viewpoint as to the comprehensive nature of modern warfare. It was an excellent organizational step. More important was another authority in the Act: "As a corollary to the council proper, the act provided for the 'advisory commission' of the council, to consist of seven persons appointed by the President upon the recommendation of that body, each of whom should be specially qualified for some particular line of endeavor which would make

his services of peculiar value. The commissioners were to serve without compensation."³ From these grants of power were to come important consequences. They provided the legislative authority by which we initiated industrial mobilization for two world wars.

In October, 1916, just a scant six months before our entrance into the war, the Council of National Defense and the Advisory Commission were formally organized. In the latter there immediately began a classification of responsibilities and their allocation to certain committees from which there would shortly develop the principal agencies of World War I. "Thus in the course of development the committee on transportation became by act of Congress the Railroad Administration; the committee on coal was the forerunner of the Fuel Administration; the Food Administration emerged from another committee; from others came the Shipping Board and War Trade Board; and through a series of developments . . . emerged the War Industries Board, which played such an important role in directing the whole ramification of the country's industrial life to the purposes of the war."⁴

As the Advisory Commission took up the work of organizing for war production the situation in this country was not reassuring. Many facilities were already under strain in meeting the needs of our allies. Procurement activities of the government were in a mess and lacked even a vestige of coordination. There were some forty different bureaus or groups each doing its own purchasing. The Army alone had from five to eight procurement departments. It was cut-throat competition among government agencies to see which could first lay claim to goods.

The satisfaction of war needs in a highly industrialized economy is no simple matter. The placing of each contract is like dropping a stone into a mill pond. Waves of effect spread over the whole economy and even into foreign countries. Consider the matter of an order for motor trucks. Its execution, of course, involves a multitude of subcontracts. Completion of these has wide ramifications. In the end the impact of the basic order may be felt at iron mines, copper mines, coal mines, rubber plantations, blast furnaces, coke ovens, steel mills, motor plants, electrical factories, and by public utilities and railroads. Moreover the interrelation involves a very delicate balance. A bottleneck at the coke ovens may mean less pig iron, then less steel, perhaps no crank shafts, and finally no motor trucks.

In coming to grips with the confusion which prevailed in government procurement, the Advisory Commission faced an issue which was basic. Many persons urged that we concentrate all government war purchasing in one agency, something in the nature of a Ministry of Munitions. While the idea was sound in the abstract, it meant a complete revolution in the

established order, the creation of new procedures and a loss of time when time was vital. A less radical change seemed indicated. It was believed wiser for the Army, Navy, Shipping Board and other agencies to continue their own purchasing, subject however to neutral control and coordination. Over-all requirements had to be balanced against over-all supply. To accomplish this we finally evolved the supreme coordinating body of businessmen whose job it was to know production schedules, requirement needs, and to determine priorities and make allotments. Unfortunately the achievement of this vital part of war organization came slowly. It was our lot to have to do it the hard way.

In retrospect it can be seen that the first step toward a successful solution of this problem was taken when President Wilson appointed to the Advisory Commission one of the politically-untouchables, a man from Wall Street. His selection caused a noticable raising of eyebrows. Nevertheless as the war went on, no other civilian appointment redounded more to the President's credit. The man was Bernard M. Baruch.

In January, 1917, Baruch initiated some informal conferences with representatives of the steel industry looking toward a more effective relationship with government if and when war came. The response was gratifying and a few weeks later the Advisory Commission passed a formal resolution providing for meetings with leaders in various industries. The creation of industry committees was authorized to be presided over by members of the Advisory Commission. A number were formed and began to serve as focal points of government contact as well as consultants on problems of procurement and prices.

Shortly, however, the Committees ran into trouble. Companies not represented on them became disgruntled. There was also the criticism that the committee members were attempting an impossible role in serving as government advisors on the one hand, and acting as prime contractors on the other. This situation led directly to a more positive step of organization. On July 28, 1917, the Council of National Defense acting "with the approval of the President," formed the War Industries Board while still retaining the Advisory Commission.

The War Industries Board took over the work of the General Munitions Board which shortly before had been formed to coordinate Army and Navy buying. It did something of even greater importance. It evolved a pattern of basic organization which was to prove highly practical. Commodity sections were formed within the structure of the W. I. B. to represent government in directing the production effort. These groups were composed of experienced businessmen purposely divorced from financial interest in the industries with which they were concerned. Then, on the

outside, new industry committees were organized to represent the respective industries. This provided government and business with channels of contact through which information could be secured and directions transmitted. Subsequently the United States Chamber of Commerce took the responsibility of organizing these outside "war service committees."

In order to accomplish its task of getting the most out of our productive machinery, the new War Industries Board needed the power of final decision as to the use of our resources and facilities. It required authority to determine relative priorities as between the Army, the Navy, our allies, ship building, and civilian necessities. This meant the wielding of a Big Stick. What Congress and the Executive had given the Board, however, was a very little one. Legally they could act only in an advisory capacity, a role inevitably enlisting little if any respect. Perhaps nowhere is any deeper sense of futility experienced than in attempting to "advise" the Army or the Navy out of some course they wish to pursue. The military services had about as much enthusiasm for an authoritative War Industries Board as the groom for a shotgun wedding.

Hugh S. Johnson, who was an Army representative on the War Industries Board in World War I, subsequently wrote: "It is not serving the public interest to withhold the observation that the American Army Supply System just didn't work. It didn't work because there was no proper coordination and organization of purchase bureaus. . . . The supply system was just a cluster of jealous and ancient bureaus. They fought the exterior control of the War Industries Board at every step even after we had contrived a plan of integration that put their men in control of practically every economic unit." ⁸

Deriving in great part from this absence of well-defined power was the fact that the War Industries Board as first constituted appeared uncertain of itself and lacking in aggressive purpose as well as in a proper delegation of authority among its executives. Things seemed to stall on dead center and other types of organization were proposed.

Even though at its first meeting Secretary of War Baker had announced unstinted support for the War Industries Board, he subsequently experienced a change of heart. "Perhaps in despair of the Board's lack of vigor, Mr. Baker found his promise invalid, surrendered to the steam roller of the Army's eager will to dominate, and thus came to seek a way out in that plan of military replacement of the War Industries Board by an organization within the Army with which Mr. E. R. Stettinius was connected." ⁹

Meanwhile, although at the cost of precious time, we were learning. We had had enough contact with actual day-to-day problems to know

that in general the machinery of the W. I. B. was well adapted to meet its problems. The commodity sections were perfecting their relationships with the various industries. With the voluntary cooperation of business, programs of priority were instituted, prices were agreed upon, and large production projects inaugurated.

Yet vital, comprehensive control was lacking. Other agencies of government endowed by Congress with specific legislative authority at times ignored or overrode attempts at centralized, unified control of prices and production. The Board was at grips with the problem but not on top of it. Time was running out. The much-feared German offensive of 1918 was threatening.

Finally on March 4, 1918, almost a year after we had entered the war, President Wilson took action. By virtue of his authority as wartime Chief Executive he effected a thorough reorganization of the War Industries Board. He named Baruch as its new Chairman and delegated to him some of the President's own war powers. The other members of the Board were to act in a "cooperative and advisory capacity." While the Chairman was given broad authority over production facilities, the really significant fact was that he now possessed final determination as to priorities of production and delivery. There was now a real boss with real power.

Thenceforth the W. I. B. began to function in a forceful and effective manner. Its new top staff included Alexander Legge as Vice Chairman, Major General George W. Goethals for the Army, Rear Admiral F. F. Fletcher for the Navy, Robert S. Brookings as chairman of the Price-fixing Committee, Edwin B. Parker as Priorities Commissioner, George N. Peek on Finished Products, Hugh Frayne for Labor, J. Leonard Replogle for Steel, L. L. Summers as technical advisor, Albert C. Ritchie as general counsel, and H. P. Ingels as secretary.

In subsequently describing the new setup, Mr. Baruch stated: "The plan of the vast organization was simple enough in form. The President's authority was centralized in the chairman of the Board. The chairman delegated, so far as practicable, the power of final decision to the several members of the Board, each in his respective field. The machinery of the 60 commodity sections was used in carrying forward the part of the general purpose for which each was responsible. Each of the commodity sections contained members from the Government purchasing agencies and each section came into contact with the industries for which it was responsible through the medium of the war service committees of the several trades."

The W. I. B. was now wielding not only one Big Stick but several. The Chairman had final authority as to priorities. While the Price Committee

was theoretically autonomous, it worked in synchronization with the W. I. B. Furthermore, the Railroad Administration and Fuel Administration, both separate agencies, gave close and forceful support. Thus every manufacturer knew that as a practical matter the W. I. B. could direct the flow of materials and fuel as well as the use of railroad facilities. In the background was the President's wartime power to commandeer.

Although some specific priority regulations had been issued, it was not until after the new Board took over that the power was employed comprehensively. On July 1, 1918, *Priorities Circular No. 4* was promulgated. It "requested" that all persons engaged in the production of raw materials and manufactured goods (except foods, feeds, and fuels) should adhere to priority regulations.

The procedure for issuance of priority ratings was roughly as follows. A manufacturer upon receipt of an order from a government agency would send an application for materials needed in the execution of the work to the Priorities Committee of the W. I. B., which in turn would consult with the proper commodity section. Then a certificate would be issued giving the manufacturer a rating for the contract in question. In turn the manufacturer would serve his certificate upon his suppliers and thus obtain his proper priority in securing materials and parts.

The volume of priority applications grew apace and another procedure was added. This was the use of the so-called automatic rating. Upon receipt of certain categories of war orders, a manufacturer could by affidavit assign a specified rating without going through the red tape of sending an application to Washington. This procedure might be invoked only for the lower priority ratings.

In further amplification of the priority principle the Priorities Committee issued a list of 73 industries to which preference should be given in supplying materials, fuels, and other requirements. In addition, ratings were published for some 7,000 different plants handling war work of particular urgency.

Up to this point these were methods of handling current business. As we gained in experience it became increasingly evident that if production were to be controlled effectively for war purposes we must look ahead and endeavor to anticipate requirements. Accordingly a Requirements Division of the W. I. B. was formed which included representatives of the various government purchasing agencies as well as of interested divisions of the W. I. B.

This was an instrument of a long-range planning. At the daily meetings of this body estimates were submitted of the future needs of the various departments and agencies, projected six months or a year in advance where-

ever possible. These were discussed around the table and each representative began to get an idea of the over-all picture. It did much to take off the sharp edge of partisanship.

From the Requirements Division these estimates were referred to the respective commodity sections of the W. I. B. where they were employed in connection with plans for increasing production and programs for curtailing the less essential uses of critical materials. After studying these estimates or proposed orders, the commodity sections would return them to the originating department with recommendations as to how they might best be filled. It should be noted that the W. I. B. did not have the power of final decision on requirements except through the exercise of its prerogative of issuing priority ratings. Nevertheless the establishment of the Requirements Division was a step of excellent wartime organization, smoothing the way and coordinating many conflicting programs. It also served to enhance the prestige of the W. I. B. as top arbiter of production.

So much for the control of materials and products. As a matter of chronology, the problem of prices was the first to become acute in World War I. Even before our entrance, responding to the demands of our allies, events in the price field cast an ominous shadow. Then when we declared war prices sky-rocketed. Between the spring of 1915 and July, 1917, pig iron rose from \$12.59 a ton to \$52.50, and Bessemer steel billets from \$19.50 to \$95. Similarly, but in varying degree, prices advanced for finished machinery, food, clothing, and other products.

The beginning of the price-fixing period of World War I was not long delayed. In August of 1917, about five months after our declaration of war, the President promulgated a schedule of prices for bituminous coal. A month later he fixed prices for copper and then for iron and steel. Thereafter, three war agencies continued to prepare price schedules most of which were issued in the President's name. These agencies were the War Industries Board (Price-Fixing Committee), the Fuel Administration, and the Food Administration. The first concerned itself largely with basic materials and commodities going into manufacturing processes while the latter two were involved extensively in fixing prices to the consumer in their respective spheres.

The area of price fixing grew, step by step, as shortages developed in various materials and products. Activated by a desire to limit government intervention, the agencies usually waited until the demand-supply situation had become critical.

The procedure was an adventure in expediency. There was no over-all authority from Congress for price fixing. The President's power to act in this field rested upon liberal and perhaps somewhat strained interpreta-

tions of various emergency Acts. Of course, the President and Secretary of War possessed definite authority to requisition or commandeer products and plants for the carrying on of the war and to determine just compensation therefor. But "the legal authority for establishing controlled prices for sales to private purchasers and to foreign Governments has never been, and perhaps never will be, adjudicated by the courts. As a matter of fact, public opinion acceded to the President, in this emergency, power commensurate with the peril and left to his discretion the determination of the degree of peril and the power necessary to meet it." *

Under these circumstances it was quite to be expected that the War Industries Board and the Price-Fixing Committee should proceed to negotiate price agreements with the various industries rather than to act arbitrarily. It was advisable to secure in large measure the consent of the governed because the essential thing was to obtain the utmost in production.

Accordingly industry representatives were brought before the Price-Fixing Committee to submit evidence to be used in determining reasonable price levels. The Committee was acting in a quasi-judicial capacity. It attempted to set prices which would yield fair compensation and stimulate efforts to increase production and which, at the same time, would not be so high as to result in conscienceless profiteering.

To attain this goal was not easy. Its achievement was facilitated by the cooperative attitude of most industry groups. The average businessman had a sincere desire to make a contribution to the winning of the war. Those few who sought profiteering plunder were discouraged by the fact that the W. I. B. could deny raw materials and transportation through the operation of priorities.

In the story of business during World War I certain facts stand out. Warning of impending events had been disregarded so that when war struck we were ill prepared. We were forced to solve the complex problems of organizing war production in haste and under pressure. As this was our first experience in modern warfare we were compelled to improvise—to proceed by trial and error.

In the early months of the war there was an underlying reluctance to abandon the traditional principles of free enterprise for those of authoritative controls. Thus we observe that the first step toward the organization of production was through an "advisory committee." This was the period of advice and sweet reasonableness. It failed to produce the desired results.

Progress in organizing war work had to bog down badly before we were ready to abandon peacetime concepts for those necessitated by war. Once

we took the hurdle, however, we improvised procedures eminently practical for handling our problems. When the war ended the War Industries Board was extending its controls smoothly from one industry to another. Even the Army and Navy had come to see the necessity for the existence of a top civilian coordinating authority on matters of production and allocation of materials. As hostilities ceased another lesson was being learned. This was that the longer the war continued the more extensive and positive must be the controls over the whole economy. A well-defined shadow was cast of the pattern which would emerge in the more prolonged World War II.

XLVIII.

PRODUCTION FOR VICTORY

World War II—Part One

THE fumbling course of developing an organization for directing war production in World War II was similar to that in World War I. It was heartbreakingly so. We acted as though we had never before been confronted with such problems. For long and trying months we brushed aside the valuable experience gained in the first conflict. We repeated many of the old errors and invented some new ones.

To make this record all the more remarkable is the fact that within hailing distance of the White House was the man who had made such a distinguished success of the War Industries Board in the previous war—Bernard M. Baruch. During the interval he had pointed out time and again the essentials of a successful war production organization. He had urged industrial preparedness. In fact he had written a textbook on the subject. Yet during much of the early period his experience was largely ignored by those directing the war effort. Finally the simple principles which he had advocated were once more applied. We then began to get on with the show.

At the outset of the preparedness-war-effort we attempted the advisory commission procedure which had so signally shown its weakness in the first conflict. The National Defense Advisory Commission, a chairmanless group, served from May, 1940, to January, 1941. Then, taking a half-hearted step forward, President Roosevelt tried a two-headed organizational experiment—the Office of Production Management (OPM). To bolster it, the Supply, Priorities, and Allocations Board was later appointed. This second stage lasted roughly one year from January, 1941, to January, 1942, and corresponded to that trying time in World War I when the War Industries Board was struggling to succeed without adequate power. Ultimately President Roosevelt was forced to delegate full author-

ity to one man, as President Wilson had been compelled to do in World War I. The final and successful form of organization for industrial mobilization was thus attained. The War Production Board, launched in January of 1942, whose Chairman, Donald M. Nelson, possessed full powers, repeated the success of the War Industries Board of World War I. In basic pattern the two organizations were quite alike.

The period between the two wars, from a preparedness standpoint, will be difficult of comprehension to future generations. In spite of the war experience of 1914-1918 national policy was still under the influence of wishful-thinking propagandists who assured us that the way to peace was in a reduction of armaments. We scrapped a substantial portion of our Navy. The Army was so skeletonized that it could aptly be termed a token force. Great munitions plants were abandoned.

But not all of our people were content with this attitude. There was an uneasy restlessness on the part of some. We find sporadic preparedness planning which unfortunately did not achieve important results. By an Act of Congress in 1920 the Assistant Secretary of War was directed to prepare plans for industrial mobilization in the event of war. In 1924 the Army Industrial College was established to train Army, Navy, and reserve officers. After prolonged study by the Planning Branch of the Office of the Assistant Secretary of War and the Army Industrial College, the Joint Army and Navy Munitions Board presented the Industrial Mobilization Plan of 1931, subsequently to undergo several revisions. In the last of these, that of 1939, the plan provided for the formation of a top agency which would have centralized authority over all phases of industrial mobilization. During war times it would have power superior to that of normal peacetime government agencies. It was to be directed by men of outstanding accomplishment in the business world.¹

Although this army plan represented years of earnest labor and our most advanced attempt at planning industrial mobilization, it came to naught. One reason may have been that it was predicated upon a sudden change from war to peace. In both world wars the transition turned out to be gradual. By the time the Japanese struck at Pearl Harbor we were already launched on a program of war production. Also, the Army proposals were politically inexpedient. Neither the New Deal nor old-time government agencies with their pressure blocs wanted to see a supreme war agency headed by businessmen.

The next official move of our World War II experience, looking toward organization of our industrial capacity, came early in the fall of 1939. Just about the time that Hitler struck the tocsins for World War II, a step was taken which aroused high hopes. Acting Secretary of War Lewis A. John-

son appointed a War Resources Board under the chairmanship of E. R. Stettinius, Jr., Chairman of the Board of the United States Steel Corporation. This Board was composed of distinguished representatives from the Army, Navy, Department of State, the field of business, and scientific circles. After a series of conferences, it submitted a report to the President in October, 1939. The President, in mysterious silence, saw fit to shelve the document.

When Hitler turned his mechanized hordes westward in the spring of 1940, the urgency for preparedness measures grew sharply. Spurred by these developments, the Chief Executive saw that something had to be done. He hesitated, nevertheless, to project the issue into a divided Congress. Nor was he unconscious of the fact that it was an election year. Many of our people still cherished the illusion that by avoiding defense measures we could keep out of war.

Accordingly the President took steps within the fabric of existing authority. Under the 1939 Act permitting reorganization of the Executive Branch, the President had the power to set up a division to handle emergency matters in case they arose. On May 25, 1940, he created the Office for Emergency Management within the Executive Office of the President. This unit, never important in itself, was to be the parent of various agencies of World War II.

Further assistance was found in statutory powers still remaining from those conferred upon the President in World War I. Under these there was authority to form a Council of National Defense and appoint its Advisory Commission. The President on May 28, 1940, appointed the National Defense Advisory Commission.

This new group, the NDAC, aptly termed the Headless Horsemen because they had no appointed chairman, was composed as follows: Ralph Budd, President of the Chicago, Burlington & Quincy Railroad; Chester C. Davis, of the Federal Reserve Board; Harriet Elliott, Dean of Women at the University of North Carolina; William S. Knudsen, President of General Motors Corporation; Leon Henderson, of the Securities and Exchange Commission; Sidney Hillman, President of the Amalgamated Clothing Workers of America; and E. R. Stettinius Jr., Chairman of the Board of the United States Steel Corporation. When this Commission met with President Roosevelt at the start of operations, Mr. Knudsen asked who was to be its directing head. The President laughed and said, "I guess I am."

Those familiar with our experience in the first world war needed no crystal ball to tell them that the NDAC would neither enjoy a long life nor a merry one. It didn't. Lasting from May to December of 1940, a period some two months shorter than the life of its prototype of World War I,

its existence was marked by that ailment known in the national capital as Washingtonitis—or second-degree frustration. Nevertheless, in spite of its shadowy status and a divided opinion among its members as to the urgency of preparedness, some accomplishments were chalked up.

Among the most significant of these were the advances made in coordination of procurement and the establishment of procedures for placing contracts for a defense program. At an early date Donald M. Nelson, Vice-President of Sears Roebuck, was brought in and made Coordinator of Defense Purchases. With rare tact and skill he succeeded in securing the cooperation of the old, traditional purchasing agencies. As the program opened up, the Commission was also instrumental in working out means whereby the Army and Navy might negotiate contracts with manufacturers without adhering to the statutory provision for competitive bidding. By such means production could be spread over a wide range of companies according to availability of facilities and labor supply. It was an essential concomitant to efficiently planned procurement.

These steps smoothed the way on the government's side. From the standpoint of those who were expected to take these large Army and Navy contracts there were other problems. Our involvement in a shooting war still seemed quite remote. Munitions work might prove to be but temporary. Inasmuch as these huge orders frequently imposed the necessity of adding to existing plants or of building new ones, the question arose as to how they were to be financed. A manufacturer might wish to assume one of these contracts but he obviously could not invest his stockholders' money in specialized facilities unless he had good prospects of reimbursement. Even if the defense product were identical with his peacetime one, there was no assurance that increased plant capacity could be made to pay its way.

Several constructive procedures were worked out by the government to break the log jam which threatened for a while to stymie the whole defense program. Over considerable opposition and in spite of the usual official inertia, the NDAC succeeded in getting Congress to pass an amendment to the income tax law which permitted newly constructed defense plants and facilities to be depreciated over a five-year period for purposes of computing income taxes. This was in effect incentive taxation.

A more positive approach to the problem was taken by Congress when it enacted legislation, approved by the President on June 25, 1940, authorizing emergency defense financing by the Reconstruction Finance Corporation. This proved to be one of the most important measures of our industrial mobilization. The RFC was granted the power to make loans for acquiring, producing, or stockpiling strategic raw materials and for

constructing, expanding, and operating plants needed in national defense. It could also create corporations to acquire property, build and operate plants, or lease them to private operators. By the end of August it had formed the Rubber Reserve Company, Metals Reserve Company, Defense Plant Corporation, and Defense Supplies Corporation.

Of the members of the NDAC, the recognized dean was William S. Knudsen. By reason of his prestige in the field of quantity production and his devotion to the cause of national defense, he was able in those early days to persuade and cajole many important manufacturers to assume defense contracts. Ralph Budd, in charge of making ready the nation's transportation system, also did outstanding work. It will be recalled that traffic bottlenecks were the curse of World War I. That these were largely avoided in the second war and that the railroads, this time under private management, turned in such a magnificent performance may be credited in part to Budd's foresighted planning.

The NDAC, among its other problems, found the anti-trust law spectre threatening defense planning as it had in the first conflict. This time the Department of Justice was out agunning for the big oil companies. It wanted them broken up into little pieces. But it was because of their very bigness that they could be so useful to the Army and Navy. Only large organizations had the plant capacity, the experienced engineers, skillful management, and ample capital needed for producing in sufficient volume the essential war materials required from this industry, such as toluene for explosives, butadiene for synthetic rubber, and 100-octane gas for our aviation. Leon Henderson of the NDAC was appointed to wrestle with the Department of Justice. He succeeded in securing postponement of this campaign and the large oil companies were permitted to concentrate on the ever-growing war needs of the country.

As the end of 1940 drew near various factors combined to clarify the situation and intensify our defense efforts. The national election was out of the way. As to the course of the war, public opinion had become more seriously aroused. The Axis powers, seemingly invincible in their might, had overrun western Europe and were now pointed toward the Balkans and the Near East. Control of the Mediterranean was threatened. On these fronts, as well as in the West, of all the great powers Britain stood alone. Her position, however, was precarious and her resources were dwindling. It was up to us to give her support in a major way or see the Axis triumph in world conquest.

A much more aggressive and extensive effort in producing the goods of war was indicated. An effective agency for industrial mobilization was urgently needed. The NDAC had all too patently shown the weakness

arising from lack of authority. It was a pigeon well on its way to early demise.

Finally on January 7, 1941, expectancy was fulfilled by the announcement of the establishment of the Office of Production Management to direct the production program. As a Board it was composed of the Secretary of War, the Secretary of the Navy, William S. Knudsen, and Sidney Hillman. From an administrative standpoint, it was made part of the Office of Emergency Management of the Executive Office of the President. But even those inured to the organizational vagaries of the New Deal were taken aback. This new Office not only had one head but two, as if to make up for the fact that the NDAC had been without any. William S. Knudsen was designated Director General of the OPM and Sidney Hillman, Associate Director General.

When asked at a press conference to explain this curious setup, the President had this to say: *

Q: Why is it you don't want a single responsible head?

The President: I have a single responsible head; his name is Knudsen and Hillman.

Q: Two heads.

The President: No, that's one head . . . "

Experienced observers of the Washington scene had no difficulty in discerning that, in spite of the two Directors General, signals for the new squad would still be called by the Head Coach.

The responsibilities delegated to the OPM were simple enough. It was to accelerate the production of military goods and materials, as well as to increase facilities for their manufacture; make recommendations as to priorities and deal with them; and it was to coordinate government purchasing. For advisory purposes there was to be a Priorities Board of six, all named by the President. The actual work of this so-called "Office" was to be divided among three principal divisions—those of Production, Priorities, and Purchases.

This was the "functional" approach beloved by planners and chartists. It was beautiful to behold on paper. In practice it just did not work. It was soon discovered that a company with war contracts was being whistled at by three different boys all on the same block, frequently with widely differing intent.

What industry wanted in order to get on with war business was a coordination of government direction and one central place to go to for information and assistance. What government needed was a mechanism within

industry through which government might deal with a truly representative group in each industry for the purpose of securing advice on problems of procurement and production. The provision of such machinery called for no act of inventive genius. It had been the basic principle upon which Baruch had built the successful War Industries Board of World War I.

Conforming to these obvious requirements, after almost six months of hectic experience the OPM in June of 1941 adopted the plan of "Commodity Sections" and Industry Advisory Committees. This was a forward organizational step. Its practical value is shown by the fact that it endured through subsequent convolutions of Washington bureaucracy right to the end of the war.

The work of these Industry Advisory Committees provides a stimulating instance of cooperation between government and business. In the OPM the program for their organization got off to a good start when Donald Nelson drafted Sidney J. Weinberg, a partner in the New York investment banking house of Goldman, Sachs & Company, to head up this work. Weinberg knew business leaders in practically every industry and possessed their confidence. Having laid out simple, common-sense provisions for organizing committees and holding meetings, the program went ahead smoothly. As of September, 1945, upwards of one thousand such committees had been formed for OPM and WPB of which 786 were active. Some 8,000 leaders in various industries had served as committee members and over 5,000 committee meetings had been held.

While the work of these Industry Committees was essential to the mobilization of industry, it was at the same time a form of cooperation between business units which might later be challenged by the Department of Justice under our anti-trust statutes. "We had to steer a difficult course because of the need for co-operation in industry under our direction and the difficulties presented by the anti-trust statutes."⁴

Faced with this anomalous situation, the Attorney General attempted to grant official indulgence. In a formal letter he stated in effect that members of the industry committees would be free from prosecution by the Department of Justice if the committees were formed at the instance of government; if their members were chosen by government and were generally representative of the particular industry; and provided their actions were limited to giving advice and making recommendations to government officials.⁵ Whatever lines were drawn under this ruling were fuzzy at best. Finally Congress summoned its strength to face up to the problem. The Chairman of WPB was given power, in consultation with the Attorney General, to issue Certificates of Immunity to companies whose cooperation was needed in the successful prosecution of the war. Thus long

did we cling in two World Wars to the cherished principle of wide open competition.

To the few businessmen then in Washington endeavoring to get on with a production program, the year 1941 was perhaps the most trying of the whole war period. The tide setting us into the conflict was running with growing force. At the same time official Washington was still split into two groups—those who believed that for us war was inevitable and those who thought our part was simply to act as an arsenal for the British.

Meanwhile, as a result of our preparedness measures, war orders were being placed in a mounting crescendo. The President had called for the construction of 50,000 airplanes and a two-ocean navy. He had forced through the Lend Lease program. With a fatal synchronism multitudinous contracts for war goods converged into a massive river of demand upon our suppliers of raw materials, notably steel, aluminum, and copper.

As serious shortages began to pinch them, manufacturers turned to priorities for relief and suddenly the OPM was deluged with applications. It was like a "flash-flood" in a mountain country. Each mail brought increased demands. Unable to cope with this unexpected turn of events, the priorities machinery of the OPM broke down badly.

In attempting to restore order on the priorities front, the President took a characteristic step. He had a passion for creating new agencies and a short memory as to responsibilities previously delegated. Having kept the OPM under leading-strings to the White House, he now avoided what was obviously needed—its complete reorganization. Instead he adopted temporizing measures and appointed a new board to be superimposed upon the old.

The Supply, Priorities, and Allocations Board, set up on August 28, 1941, was to be the chief overlord in carving up the supply of scarce materials. It was to decide how much was to be apportioned to the needs of the Army, Navy, Maritime Commission, Lend-Lease, and civilian necessities. It was likewise to determine the relative priority of competing sections of the civilian economy.

SPAB was made up of the four members of the OPM board, to whom were added the White House favorites, Leon Henderson, Harry Hopkins, and Henry Wallace. Thus when Knudsen, Hillman, Stimson, and Knox sat around the table they were OPM. When, however, Hopkins, Henderson and Wallace joined them, they became SPAB and had complete authority over themselves on priority matters. Donald M. Nelson was made Executive Director of SPAB and Director of the Priorities Division of OPM, functions he was supposed to perform without the use of mirrors.

Human nature, however, is wonderfully adaptable. In spite of this

confused setup, the principals in question achieved some success in getting on with the war effort. A start was made toward securing over-all estimates of our requirements and productive capacity in various critical materials. At long last, priority ratings were made mandatory. An all-out program of production was determined upon for certain materials and clear recognition was given to the need of maintaining a healthy, effective civilian economy.

This was the situation that prevailed at the time of Pearl Harbor. The top management for direction of war production had gone through many motions and had made some progress. Nevertheless, the organization was still a mess. The need for simplification of structure and concentration of authority was acute. Hence the Washington grapevine began to vibrate with rumors of change, reorganization, and the appointment of a production czar. The climax was not long in coming.

In its unfolding an incident of dramatic human-interest occurred. William S. Knudsen, Director General of the OPM, had kept unremittingly at his task in spite of rumors and the loss of prestige in the formation of the superboard SPAB. During the whole period of his preparedness-war service, which began back in the spring of 1940, he had given unstintedly of himself, and had set an inspiring standard of self-dedication to his country's needs. Some of the President's advisors, however, felt that Knudsen was not proceeding rapidly enough with the program of conversion. Their criticism was fed by quick changes in the military situation. Opposition grew apace.

On January 15, 1942, Knudsen was in his office as usual, striving to cope with the headaches which were his. Late in the graying dusk of that winter afternoon, a loyal secretary burst in and laid on his desk a scrap torn from a news ticker. This news flash stated that the President had just designated Donald M. Nelson as top boss for War Production. Knudsen as Director General had been dethroned. Not even a word in advance or a thank-you from the White House! It was a cavalier way to treat a distinguished citizen. For almost two years, without adequate authority Knudsen had stood up under blows and frustrations which would have sent men with less patriotism home in disgust. It must be said at once that the announcement of the change was as much of a surprise to Nelson as it was to Knudsen.

In appointing Donald Nelson as Chairman of the War Production Board, the President had finally brought himself to do what had long been needed. He delegated adequate authority over production to one man. It was the same move to which President Wilson had been reluctantly forced when he named Baruch as head of the War Industries Board of World War I. After President Roosevelt's experience with NDAC, OPM, and SPAB, he

had finally become convinced that the all-out war effort applied to Washington agencies as well as to industrial production. In order to assure adequate power he allowed Nelson to draw up the Executive Order establishing the WPB.

This order, promulgated on January 16, 1942, gave to "The Chairman of the War Production Board, with the advice and assistance of the Board . . ." "complete authority over all government purchasing as well as over industrial production, both for war and for the civilian economy; power to determine allocations and priorities as to materials and facilities; and finally it was provided that the Army and Navy Munitions Board was to report to the President through the Chairman of the War Production Board.

Hardly had Donald Nelson seated himself at his new desk before he was called upon to make perhaps the most critical decision of his whole war service. This was one which had the armed services on tenterhooks. Should he take over all government war procurement? Having drawn the substance of the executive order which established his power, it was no mere slip of the pen that found the Chairman of the WPB in a position to do so if he wished. Moreover there was a mounting tide of opinion which believed that only by centralizing government purchasing could we effectively organize production. The long corridors in the Senate and House office buildings resounded to such expressions. Throughout the country manufacturers harassed by the competitive efforts of Army and Navy "expeditors" were strong for the idea.

Without hesitation, however, Nelson rejected proposals for centralized purchasing or for a "ministry of munitions." Seemingly this was most wise. It was the same conclusion which Bernard Baruch had reached under similar conditions in World War I. Accordingly the actual placing of war contracts was left with the Army, Navy, Maritime Commission, and other agencies but, as the WPB perfected its organization, a higher degree of coordination was achieved.

It took time and several internal shake-ups to achieve a well-knit organization for the WPB. Nevertheless its general pattern remained the same, following the form which had begun to take shape under the OPM. The base of the whole structure was the "commodity section," or industry division, manned by experienced businessmen and persons trained in the various industries. Each of these units was in effect a small WPB and operated with the help of an Industry Advisory Committee. It was through these channels that the functions of the WPB were actually carried out. To each section or division were assigned representatives of government claimant agencies, such as the Army and Navy. These officials would indi-

cate their needs and thenceforward it was up to the appropriate commodity section of the WPB to see that they were met or adjusted to over-all programs.

As requirements for materials, munitions, and equipment flowed into the WPB, these were sorted, classified, and presented to the Requirements Committee which had the responsibility for the over-all determination of allotments of the materials which were in short supply. On this top committee were representatives of the claimant agencies whose demands came before it—the Army, Navy, Maritime Commission, Lend-Lease, Office of Defense Transportation, and others. Thus the Requirements Committee served as a Supreme Court, with all parties of interest represented. In case of disagreement, the Chairman of the WPB, under his directive from the President, had final authority for making decisions.

Having provided the main channels for directing production needs, there were also established such staff offices in the WPB as changing circumstances required. These included such functions as the formulation of priorities regulations, rules for conservation of materials, construction and location of new facilities, handling of labor problems, protection of civilian needs, legal and other matters.

As Nelson and his associates got the newly created WPB under way, they were confronted with areas of jurisdiction which seemingly expanded every twenty-four hours. Our war needs grew at a fantastic pace. Conversion of plants to war work spread to almost every community in the United States. Materials were sought over the seven seas. This meant an unwanted but nevertheless necessary growth in the personnel of the WPB. It soon became obvious that we were losing time in trying to do so much in Washington. Accordingly a program of decentralization was adopted and the field offices, started under OPM, were more intensively developed. They served importantly as local contact posts through which members of industry could secure official information and a prompter processing of necessary documents.

Thus all of the basic elements of organization had slowly been evolved to mobilize and direct production—staff units, commodity sections, industry committees, the Requirements Committee, and territorial branches. These simple organizational components were expanded as our war efforts grew, till at its peak the War Production Board, with thousands of employees, was directing practically the whole field of American production. It exercised supreme dominion over the most extensive and powerful aggregation of productive facilities that had ever been mobilized for war.

Astonishingly enough, the authority to wield all this power was not conveyed directly by a single-purpose emergency Act of Congress, as in the

case of the OPA. Rather it was an accumulation from several sources, none of which gave intimation of what was in store. The most important was a series of priority statutes enacted in 1940, 1941, and 1942. "Substantially all the controls exercised over the industries of the country by which they have been converted from peace to war operation are derived from the few phrases of a general character by which Congress granted to the President power to issue priorities and, in case of shortages, power to allocate materials and facilities in such manner, upon such conditions and to such extent as he shall deem necessary or appropriate in the public interest and to promote the national defense." Coupled with these priority powers was the added one permitting the requisitioning of goods and facilities. Finally, it had long been recognized that from an administrative standpoint the President could, by executive order, create new agencies to assist in carrying out his executive responsibilities. From all these sources did the WPB derive its existence and its chairman the powers which in effect made him the wartime czar over American business.

Supplementing the work of the WPB and the Industry Advisory Committees were some self-organized groups of manufacturers such as the Automotive Council for War Production which brought together leading associations of companies engaged in automobile, truck, parts, and tool work. This was in effect the self-mobilization of the world's then greatest manufacturing industry for the purpose of cooperation in war work—the extension of subcontracting, exchange of information on work processes, and on other matters.

Similarly the large aircraft producers of the Pacific Coast formed the Aircraft War Production Council. This was one of the most inspiring examples of voluntary wartime teamwork. Here the members pooled materials and parts so that a manufacturer who suddenly ran short could borrow if any of the other members possessed a surplus. In addition, regular meetings were held to exchange information on technical matters and production problems. Later the group became national in scope and the National Aircraft Production Council, Inc., was organized. It maintained an active Washington office which did yeoman service in facilitating relations between government and the aircraft manufacturers.

Of a different nature were groups of small manufacturers organized on a territorial rather than an industrial basis. In these cases all the shops of a given community or area would get together for advancing subcontracting. The purpose was usually to see that as many of the small shops as possible received an opportunity to convert to war work and that their labor was not pirated by large concerns.

XLIX.

PRODUCTION FOR VICTORY

World War II—Part Two

THE most effective power vested in the WPB was that of priorities, or the authority to determine the distribution of scarce materials, goods, and equipment. At the outset our practices followed closely those which had been used in the first world war. The usual procedure was for a manufacturer in need of a critical material to apply to the OPM, or later to the WPB, for a priority rating which could be served upon his suppliers. In addition, procurement officers of the Army and Navy enjoyed the privilege, in placing orders for war goods, of using blanket ratings which a given manufacturer might extend without further reference to the WPB.

We were sailing blithely along under this system when things began to go awry. A manufacturer of some essential munition who had been successfully securing raw material by applying a top rating of A-1 would suddenly discover his priority-money valueless. His suppliers would be deluged with orders bearing A-1 ratings. Then we invented the AA series. All down the line, ratings were jumped as the orders for goods ran substantially ahead of supply. There was no quantitative control. A rating good one day would be valueless the next. We were suffering from an inflation of priority ratings as devastating in its effect as a money one. We were learning the hard way that priority ratings in themselves provided no solution to situations of acute shortage.

This placed us in relatively unexplored territory. The ready solution would have been a comprehensive system of allocations with definite control of supply and outgo, just as a bank account is run. As to this we faced various difficulties. In many cases we did not know the extent of our supplies nor did we have a clear idea of our requirements. Furthermore the administration of allocations involved an alarming amount of

paper work for an economy as large and as complex as ours. More paper work meant more bureaucracy.

Meanwhile we applied regulations of conservation in varying degrees of strictness. These, as well as occasional procedures of direct allocation, were implemented by two series of WPB orders—the M-series and the L-series. The first to appear, early in 1941, was the M-series, often referred to as Conservation Orders. They usually restricted or denied entirely the use of some scarce material. Soon thereafter the L-series was commenced. These latter, frequently called Limitation Orders, normally restricted or terminated the manufacture of some end product either for the purpose of conserving material or to force conversion of manufacturing facilities to war products.

In grand total upwards of 700 M and L orders were issued by the WPB. That meant stepping on a lot of toes. Hardly any businessman in the country escaped control of some sort. Many were just put out of business. For the most part these hardships were taken in good spirit. Where the privations were inherent in the process of conserving critical materials for war use no one could legitimately complain. Unfortunately however there were instances of hastily drawn, ill-considered regulations which required an embarrassing number of amendments.

To safeguard against such happenings it became the custom to submit proposed L and M orders and priority regulations to the respective Industry Advisory Committees. Hence the businessmen who had to work under a regulation were given a hand in its formulation. Their advice was usually practical and on a high plane of patriotic war service. However even this procedure was not free from trouble. It was astonishing how difficult it was to foresee the effects of these governmental interventions in the economic order. To advocates of paternalism it should have been a lesson in humility.

As we observe the events of the year 1942, we are once again struck by the fact that the development of industrial mobilization was almost wholly empirical. We were feeling our way. Military requirements were subject to kaleidoscopic change and unpredictable growth. By mid-1942, however, we began to sense the true extent and vast complexity of the job of producing the goods and munitions called for by the military programs.

Quite correctly, the armed forces not only aimed at matching the enemy in weapons and ammunition, but sought overwhelming superiority. To their needs, which in themselves were of astronomical proportions, they frequently added a factor which both confused and irritated those having to do with production. Actual requirements were overstated with the

idea that by so doing an incentive would be provided for greater production.

When in the summer and early fall of 1942 we attempted a reappraisal of future military needs and probable output, we found a disheartening gap. Estimated requirements ran way ahead of any foreseeable production. Furthermore, there was a shocking lack of coordination between various programs. "The most urgent production programs of the military, naval, and air forces, and those of the shipping and lend-lease agencies were in violent collision."¹

As Nelson and his associates on the top staff of the WPB sat down to consider these factors of need and output, they could sympathize with the rabbit that had to climb a tree. As the existing system was not getting the desired results, something drastic would have to be done. We must not only attain greater production but much more effective coordination of programs. This situation led to an important reorganization of the WPB and the imposition of more effective controls.

Nelson's first move was to strengthen the WPB top command by bringing in two well-known businessmen. Ferdinand Eberstadt, a New York investment banker, was named Program Vice-Chairman and Charles E. Wilson, President of the General Electric Company, was made Production Vice-Chairman. The difficulty of differentiating their respective areas of responsibility was later to give trouble.

As Program Vice-Chairman, Eberstadt was placed in charge of programs for producing war goods and served as Chairman of the Requirements Committee. At the same time he was given supervision over most of WPB's industry divisions. Thus, under Nelson, there was vested in one man the authority to determine and coordinate production programs as well as the power to direct industry divisions to their fulfillment.

When, in September, 1942, Eberstadt assumed his new job he found waiting for him one of the most difficult problems of World War II. The key to program coordination and production acceleration was the proper distribution of the basic manufacturing materials—steel, copper, and aluminum. But our first attempt at a comprehensive allocation of these metals was not thriving. Previously there had been an abortive Production Requirements Plan which had run into a cross-fire from the military on one side and large manufacturers on the other. This plan, applicable at first to the metal industries, was based upon monthly allotments of critical materials to plants engaged in war work.

Meanwhile in various minds were germinating other solutions to this problem. Members of the Steel Division of the WPB were impressed with the allocation system in use by the British. The armed services looked with

favor upon over-all allocations to the claimant agencies for distribution by them as contracts were placed. Prime contractors, on the other hand, thought that the WPB should make its distribution to them in the first instance.

"Mr. Eberstadt brought these various groups together behind locked doors, including some British advisors who were flown over for the purpose, and came out with a compromise and composite system which was approved by Mr. Nelson and presented as the Controlled Materials Plan on November 2, 1942, to become partially effective April 1, 1943, and fully effective July 1, 1943." *

The Controlled Materials Plan, CMP, provided the urgently needed solution to the problem of controlling production through the allocation of materials. While it applied only to the distribution of steel, copper, and aluminum, such was their broad usage that in controlling them a practical direction was achieved over the production of munitions and war goods. The fundamental advantage of CMP over its predecessor, PRP, was that controls were imposed at the outset, before orders were placed and before manufacturers started scrambling for metals.

Under CMP, the procurement agencies, such as the Army, Navy, Maritime Commission, and Lend-Lease, must come to the WPB with claims for materials prior to the placing of orders under their respective programs. When all of the war-product purchasing agencies had made known their needs and the WPB had likewise estimated civilian requirements, the Requirements Committee of the WPB could then measure total needs against total prospective supply. Adjustments and rearrangement of quotas could be made at the outset as programs were formulated. Definite allotments were then made to the claimant agencies who divided them between prime contractors who, in turn, passed them on to subcontractors.

In his report of October 9, 1945, the Chairman of the WPB stated:

At the same time, CMP forced the procurement services to cut their coats to fit their cloth. When allocations were made through the claimant agencies, instead of through their contractors, each procurement branch knew how much material it would have to work with in a given quarter, and it had to tailor its required delivery schedules accordingly. Military contracts were cut back to something like feasible limits, indirect military and essential civilian requirements were protected, and competitive expediting was reduced.

CMP continued through ten quarterly periods, and it did its job well. Because it was limited to three basic metals, it had to be supplemented by other allocation systems for other materials, some patterned after CMP, others adapted to the

peculiarities of the product they covered. Among the more important of these were controls over pulp and paper, lumber, textiles, tires, and chemicals.³

When Nelson in the fall of 1942 had succeeded in securing the services of Charles E. Wilson for the WPB he had labored to good effect. As President of the General Electric Company, Wilson had shown himself to be one of our ablest and most forceful business leaders. In his role of Production Vice-Chairman of WPB he was going to need these qualities. He was charged with increasing the production of critical components and scheduling their delivery under an integrated program of putting munitions into the hands of the military as needed. He was furthermore assigned the special responsibility of accelerating the production of aircraft, landing craft, and vital electronic devices. He had been handed not only one hot potato but a whole basketful.

Few people have any conception of the extent and complexity of these problems. "The components going into finished products necessary for modern war range all the way from minute jewel bearings for delicate instruments to huge steel castings and forgings, from tiny fractional horsepower electric motors to mammoth marine turbines, and many of these components, such as engines, pumps, winches, motor controls, and axles, have subcomponents of their own, each of which must be produced and delivered in proper quantity and on schedule or some vital end product will be delayed."⁴

Wilson lost no time in vigorously attacking these problems. Through WPB orders and a Component Scheduling Plan (CSP), he applied the common-sense rules for directing production in a single factory to the innumerable plants throughout the nation. This resolved itself into detailed monthly supervision by the WPB to assure that production of components moved in proper relation to the delivery schedules of the final implements of war. It was scheduling and production management on a scale of heroic proportions. Bottlenecks were broken, blocks removed, coordination perfected, and the whole program of war production accelerated.

As if he did not already have troubles enough, Wilson soon discovered that there were problems in Washington other than those of actual production. Almost from the outset he found himself in head-on collision with the War Department. Although Wilson became the principal target, the whole thing was a recrudescence of the perennial conflict between the WPB and Army procurement officers. It was the old issue of who should have ultimate authority over the nation's production machinery.

Unfortunately this new clash with the War Department now led to an intramural battle at the WPB.

Eberstadt drew away from what might be termed established WPB policies and ranged himself with the Army in active opposition to Nelson and Wilson. His point of view may have been somewhat conditioned by a period of service as Chairman of the Army and Navy Munitions Board. His Controlled Materials Plan had met with impressive Army support.

On the other hand Wilson, with Nelson's backing, had taken a stand on scheduling which the Army bitterly opposed. Both men were convinced that with various claimant agencies all pressing the advancement of their own programs, a neutral agency should have ultimate authority to coordinate deliveries of critical components. Furthermore, that the WPB must of necessity exercise that prerogative as it already had responsibility for directing industrial production. The Navy was ready to accept this commonsense solution. The Army, however, was adamant. Its high brass on procurement dug itself in and prepared a counteroffensive.

Nelson later described the situation in these terms:

The disagreement was basic, for it was obvious to me that unless the items in question were properly apportioned the major production programs could not be carried through simultaneously. Every bit of evidence I had gathered showed that the companies which were producing ships, planes, high-octane gas, and synthetic rubber, were hoarding components far in excess of their immediate needs. For example, we found that valves were being delivered to some contractors seven to eight months ahead of time, and this meant, of course, that elsewhere there was a shortage of valves for ships, tanks, and other important programs, and schedules were not being met. It was plain common sense to hold that the way to correct this situation was to arrange for the valves to be delivered just ahead of the time when they were to be installed in the finished products. Once we could do this, in this case and in others, we would find that our economy could make all the valves—or heat exchangers, compressors, motors, or what not—that these vital programs needed.

Also, it was obvious that WPB was the only agency that could do this scheduling job. Orders for critical common components were coming from the Navy, the Army, the Air Corps, the Maritime Commission, the Petroleum Administrator, the Rubber Director, and the essential civilian economy. With the best will in the world, no one of these could possibly straighten out the mess. Some outside agency had to do it. That was what WPB had been set up to do.⁶

This issue was regarded as vital to both sides. Nelson, if anything, made his mistakes in being overconciliatory but even his attempts at peace-making availed nothing. Feelings grew more intense. Because their respon-

sibilities somewhat overlapped, serious questions arose as to the relative authority to be exercised by Wilson and Eberstadt. Nelson resolved this problem in favor of Wilson by transferring to him some of the Divisions over which Eberstadt had formerly ruled.

The Army then apparently decided that both Nelson and Wilson were to be expendables. A plan was evolved for their removal and a meeting arranged with President Roosevelt. The idea was to have Bernard Baruch named as Chairman of the WPB to succeed Nelson, with Eberstadt as his deputy. "In February, 1943, when Nelson proved unable to drive so spirited a team [Wilson and Eberstadt], Stimson and other administration leaders joined in asking the President to replace him with Bernard Baruch."

Upon suddenly learning of these moves, Nelson caused an associate to confer with Secretary of War Stimson who confirmed them. At this point, Nelson the peace-loving started throwing punches himself.

"I immediately called in Mr. Eberstadt, asked for and accepted his resignation, and announced the fact to the press, stating that Mr. Wilson was named Executive Vice Chairman of the Board, with full authority over its operations. A great commotion ensued, and, as far as I know, the meeting that was scheduled for the President's office that afternoon did not take place."

Although differences of opinion with the military were to continue, the organizational issue within the WPB was settled. That body had reached a final and successful form which was to continue until victory was achieved. The distribution of scarce basic materials was carried on under CMP. The scheduling of components was satisfactorily worked out by Executive Vice-Chairman Wilson.

Meanwhile President Roosevelt had been increasingly impressed with the need for a supervisory authority to correlate the broad economic aspects of a nation at war. There was of course an intimate connection between problems of production, wages, prices, manpower, and the treatment of the civilian consumer.

In order to coordinate government policies on these matters at the top level the President on May 27, 1943, issued an order:

"There is hereby established in the Office for Emergency Management of the Executive Office of the President an office of War Mobilization, which shall be under the direction of a Director of War Mobilization . . ." With James F. Byrnes as Director this new agency comprised the capstone of a comprehensive war organization.

The peak of over-all war production was reached at the end of 1943. This was just two years after Pearl Harbor and almost two years since

President Roosevelt had created the WPB with Donald Nelson as its Chairman. Into those short, hectic twenty-four months was crammed a saga of accomplishment. Under the direction of businessmen at the WPB, American management, capital, and labor performed miracles in the field of production. The free enterprise system had gone to war. From the shops of Hartford, Pittsburgh, Detroit, and from communities throughout the nation had poured a flood of munitions which made the resources of the totalitarian nations seem puny in comparison.

While we have limited our attention to the organizational methods by which war production was directed, this was of course but part of the picture of our war economy. It was, however, the phase with which businessmen were most comprehensively concerned. The stories of other directing activities have been told or will be told. Each in its sphere contributed greatly to final victory. Credit must be accorded to the Office of Price Administration, War Shipping Administration, Reconstruction Finance Corporation, War Food Administration, Petroleum Administration for War, Solid Fuel Administration for War, Office of Defense Transportation, and many others that helped us wage total war.

But the attainment of our production objectives brought in a new crop of problems. As goods poured into arsenals and depots the military began to cut back their orders with manufacturers. Critical materials were becoming easier and a small surplus of labor occasionally cropped up. These developments caused many officials and businessmen to give thought to the problems of reconverting the war industries. Our sad experience in failing to plan ahead for war served as an incentive to early consideration of a program of restoring production of peacetime goods as war necessities tapered off.

Unfortunately the questions thus raised brought radical differences of opinion and led to a final top-echelon change in the WPB. In June of 1944 Nelson and some of his associates proposed a restrained, modest feeling out of reconversion within the limits of available material and surplus labor. They were supported by the Truman Committee and other government officials. The army vigorously opposed this suggestion. The labor supply was still short in certain cities and army officers believed that excess labor in one district would migrate to areas where it was needed. The Nelson school of thought was convinced that as the war drew to a close labor no longer had an incentive to move about and accordingly would stay at home.

Also involved in this problem of reconversion were factors which split the WPB and official Washington into two camps. Many of our companies, especially some of the large ones which had gone all-out in war

production, were still heavily engaged in munitions work. Other concerns had run out of war contracts and were anxious to get permission to reconvert to the production of civilian goods. If they were permitted to do so, they would gain a competitive advantage over those concerns still heavily hooked with war business. Accordingly some officials believed that reconversion should be postponed until all could start somewhat evenly. The issue thus posed was one of the thorniest of the war.

Nelson as Chairman of the WPB advocated an immediate but strictly controlled commencement of reconversion. Vice-Chairman Charles E. Wilson disagreed and on this question ranged himself on the side of the Army. Controversy became keen and bitter. The nerves of these two officials who had given so much of themselves to the war effort had now become raw and on edge. Nor was the support of their partisans marked by restraint. Most regrettably Nelson and Wilson found themselves in head-on collision. They had fought side by side when the going was tough. Now when victory was in sight they faced as between themselves a seemingly irreconcilable issue.

The conflict became so inflamed that President Roosevelt was forced to intervene. Nelson accepted an important mission to China. Wilson resigned to return to his job as President of the General Electric Company. A career public official, J. A. Krug, who had rendered distinguished service, first in charge of the Power Division of the WPB and then as a Vice-Chairman, was made Acting Chairman to succeed Nelson. Later in the fall of 1944 Krug became Chairman and saw the WPB through its final months of existence.

We have followed the development of industrial mobilization from its first stirrings in 1939 to its final successful stage in the years of greatest production, 1943 and 1944. Gratifying as the ultimate result was, one cannot help but wonder at our difficulties in achieving an effective organization for directing war production. Why had we been so slow? Why had it taken so long? Why were there so many changes?

The answers to these questions are of vital importance to the American people. A third world war could happen here.

While there is as yet an inadequate perspective, certain conclusions even now seem well supported. Timely preparation in the prewar period was retarded by the opinion on the part of some of our people that war could be avoided by an isolationist attitude. Twice within one generation this has proved a fallacy. We have been slow in appraising our danger from totalitarian nations whose very existence depends on expansion. Both the Administration and Congress showed an unwillingness to face realities in 1939 and 1940.

Once the election issue of 1940 had been decided the atmosphere was clarified considerably. Although the President faced a divided Congress his own leadership became forthright and courageous. He saw clearly that Britain's cause was our cause. Long before many of his countrymen, he sensed that our freedoms were in danger and that Hitler could only be stopped with the help of the armed might of the United States. This was statesmanship on a high plane. His fine teamwork with Winston Churchill was a major contribution to the cause of preserving human liberty in the Western World. The enactment of the Lend-Lease Act in early 1941 was one of the vital accomplishments of the war.

Nevertheless, it cannot be said that the President was in all respects a great war leader. As we have seen in the foregoing record he sought through long months of precious time to carry on defense measures as a one-man business. He thought of himself as head of NDAC and attempted to drive OPM with unofficial reins from the White House. His use of his own intimates, instead of Cabinet officers, as directors of the defense effort was ill-conceived and tended to promote confusion.

The fundamental difficulty was that the President lacked a sense of the principles of good organization. He did not think in terms of sharply defined lines of responsibility. Even his own Secretary of War had occasion to declare: "But the President is the poorest administrator I have ever worked under in respect to orderly procedure and routine of his performance. He is not a good chooser of men and he does not know how to use them in coordination."⁹

Roosevelt's whole training had been in the political arena where compromise and opportunism are common rules of practice. To him, in so far as possible, issues should not be met; they should be avoided. This point of view is well illustrated by an interchange between the President and Donald Nelson on the occasion of the struggle between the Army and the WPB as to Eberstadt's position. The President had complained of the recurrent misunderstandings between the War Department and the War Production Board. Mr. Nelson relates the conclusion of this talk:

"I said, 'Mr. President, these collisions you speak of have been due to the fact that the Army, at the top particularly, does not recognize the authority which you have conferred on me as Chairman of the War Production Board. I believe the whole matter could be settled if you would call us all together and tell us exactly what you meant when you set up the War Production Board and exactly how you expect the Army to act under that Executive Order.'

"He smiled and said, 'Good night, Don.'"

In the unfolding of those events which saw us embarked on World War II, it early became clear that money as well as men and machinery would have to be mobilized. The needs of modern warfare are measured in gigantic figures. Moreover it was plain that not only must we supply our own requirements but that our credit would be drawn upon heavily to support our allies. The problem of war finance loomed large and gave promise of becoming intricate.

Under peacetime conditions the relationship between the Treasury and our Federal Reserve System had been one, in theory at least, of each going its separate way. This was as it should be. Experience has taught that where central banks come under Treasury domination, their integrity is often violated and their purpose bent to partisan ends. When war struck in December, 1941, this relationship changed abruptly. The Treasury and the Federal Reserve System became a closely knit team. Our banking system volunteered for war service and accepted the Secretary of the Treasury as its Commander-in-Chief. The Board of Governors became his general staff, the Federal Reserve Banks his field headquarters, and the member banks made up the army.

The work of this army of finance during the war involved a higher degree of organization and the exercise of broader authority than ever before. Its activities extended over several fronts. The main one, of course, was that of carrying out government financing. In addition the Board of Governors of the Federal Reserve System undertook measures of selective or qualitative credit control through the issuance of regulations relating to consumer credit and in regard to the margin requirements for carrying securities. Finally, the Reserve Banks acted as government fiscal agents for V-Loans made to enable industry to finance the massive production of goods required to carry on global warfare.

In providing funds for waging war, Congress had just two ordinary sources of revenue—taxation and the sale of government securities. It was upon the latter that the greatest reliance was placed. In carrying out this objective, the Federal Reserve System became the keystone supporting the whole massive arch of government wartime finance.

The first step was the determination by the Treasury of its security selling program. For some years, due to the heavy influx of gold and the easy-money policies employed to stimulate recovery, interest rates here had prevailed at extremely low levels. Secretary of the Treasury Henry Morgenthau regarded this situation with something more than equanimity. If the government could do its war financing at these low rates, it would set an all-time record, and save itself vast sums in interest. Accordingly he adopted in general the existing prices for government bonds as the

official "structure of rates." This meant a range of from $\frac{1}{2}$ per cent on 90-day Treasury bills to 2 $\frac{1}{2}$ per cent on long-term bonds.

To declare for such a policy was easy. The catch, however, would come in making it stick. Under the ordinary law of supply and demand it was a certainty that enormous new issues of government bonds at frequently recurrent intervals would operate to drive down security prices and raise interest costs. Being a forthright man, Mr. Morgenthau decided to suspend this law for the duration. He did not wish to see repeated the increase in interest costs which had occurred in World War I.

What the Secretary needed to achieve his ends was a large source of funds, amenable to his direction, to be used to support the market in government securities in conformity with the rate pattern he had set as his goal. Quite naturally his thoughts turned to the Federal Reserve System. Its Reserve Banks and member banks possessed billions in resources and their officials had expressed a desire to assist in the war effort.

An understanding was reached which was later described by the Board of Governors as follows:

"When the United States entered the war in December of 1941, the Federal Reserve System announced that it was prepared to use its powers to assure that an ample supply of funds would be available at all times for financing the war effort and to exert its influence toward maintaining conditions in the United States Government security market that would be satisfactory from the standpoint of the Government's requirements."¹⁰

The System was called early to the colors. After war broke out it was necessary to go into the market and make large purchases of government securities in order to prevent a break in prices. Thenceforward, for the duration, the System assumed the responsibility of not only conducting heavy open-market operations to maintain the Treasury rate structure but also of supplying member banks with large amounts of added reserves. These were needed to enable member banks to purchase government bonds as well as to supply business with added working funds required for the growing volume of war production.

Various emergency devices were used to implement these undertakings. Credit was made cheap and abundant. The ordinary rediscount rate was held at 1 per cent and a preferential one established at $\frac{1}{2}$ per cent on member-bank loans secured by government obligations of maturities not longer than one year.

Furthermore in order to induce member banks to subscribe liberally to Treasury bills, an arrangement was offered which made such holdings practically as liquid as cash. The Federal Reserve banks stood ready to

buy bills at $\frac{1}{2}$ per cent discount and member banks were given the option to repurchase on the same basis.

The general plan was that the banks of the country would take the greater part of the short-term obligations and that non-bank investors would purchase the long-term issues. It was also hoped that the latter would absorb the lion's share of the total. A potent reason for this was the desire to limit inflation.

As we have already seen, when a bank subscribes to an issue of government bonds, it does not draw on an existing deposit account but on the contrary pays for the bonds by establishing a new credit or deposit in favor of the Treasury. Thus there occurs an increase in the country's pool of demand deposits or check money. An inflationary step has been taken.

Through the long years of the war the Federal Reserve system and the banks carried on. Submission to Treasury direction proved workable. The over-all results were eminently successful. The government was provided with all of the money it needed although its requirements were staggering in amounts. Intensive war-loan drives aimed at the individual investor secured a widespread participation of our people in the financial support of the government. The rate structure of interest costs was preserved or slightly bettered. As the war ended the interest cost of total outstanding debt averaged less than 2 per cent per annum.

But supplying the Treasury with funds for direct expenditures was not the only area to which this army of finance was called. The making of V-Loans became an essential factor in the successful prosecution of the war. The Federal Reserve System furnished the machinery by which this vitally important program was carried out. Its origin and method of operation are of interest.

The production program of World War II, differing considerably from that in the first war, was not only stupendous in the aggregate but was so comprehensive that almost every little machine shop or factory was mobilized. As this vast complex of productive machinery began to take up war work, one of the first problems encountered was how to procure added working capital for expanded operations. Larger sums were needed for new materials, increased payrolls, and all manner of expenses.

Such requirements would ordinarily be supplied by loans from commercial banks but the latter found that many such advances exceeded credit limits or breached those principles of conservative banking by which the integrity of depositors' funds is preserved. The growing seriousness of this situation was thrown into high relief in February of 1942. The production of certain military planes was suddenly threatened be-

cause a subcontractor making an important part could not secure needed working capital.

Officials of the War Department then suggested the procedure which at once became an important element of the war-production program. The President, under authority of the first War Powers Act, issued Executive Order No. 9112 on March 28, 1942. In brief this empowered the War Department, the Navy Department, and the Maritime Commission to guarantee or participate in loans made by banks to finance manufacturers in war work. The order designated the Federal Reserve Banks as fiscal agents to represent the government in concluding such arrangements. On April 10, 1942, the Board of Governors of the Federal Reserve System issued their Regulation V. Thus was established the procedure for the extensive working capital V-Loans of World War II. Variations of the formula to assist manufacturers through termination of war contracts and reconversion were designated as VT- and T-Loans.

The significant feature of these arrangements was that government aid was mobilized through ordinary banking channels. The extension of credit was kept as a local operation. The way it worked was that a manufacturer in need of working capital would apply to his local bank. If the amount desired was more than the latter could prudently supply, the application would be sent to the nearest Federal Reserve Bank or branch. After investigation and upon certification, the War Department, Navy Department, or the Maritime Commission, as the case might be, would enter into an agreement to guarantee a portion of the advances to be made by the local bank or banks.

The amount of the loan which was so guaranteed varied in each case and might run as high as 100 per cent in rare instances. However the Federal Reserve Banks and the procurement agencies felt that the local banks should assume some risk and responsibility, so an attempt was made to keep the amount of guaranty down to 90 per cent or under. For the service of guaranty, the respective government agency received a percentage of the fees and interest paid on such loans. Interest rates varied up to a maximum of 5 per cent, and of such charges the procurement-guarantee agency received anywhere from 10 to 50 per cent, depending upon the amount of the guaranty.

That this service was an important one in furthering war production is attested by the fact that prior to December 31, 1945, the Federal Reserve Banks received some 9605 applications for loans amounting to over \$10 billion. Actually 7999 agreements were executed for credits totalling \$9.9 billion. The largest amount of credit outstanding at any one time was a little over \$2 billion in July, 1944.

About 1400 banks or financial concerns participated in these arrangements. The smallest deal was for \$400 and the largest for \$1 billion. Some 58 per cent of the number of V-Loans approved were for sums of \$250,000 or less. But most of the credit went to the large loans. Those of \$1 million and above accounted for upwards of 80 per cent of the total. Many of these were way beyond the loan limits of local banks.

In a program as comprehensive as this, dedicated solely to accelerating war production, one might expect that the government would lose substantial amounts which of course could be written off as legitimate war expense. Such was not to be the case. As of December 31, 1945, it was estimated that the aggregate losses to the War Department, Navy Department, and Maritime Commission would not be over \$6 million. Against this they had received net fees for the guarantee service of over \$28 million after allowing for reimbursement of expenses to Federal Reserve banks.¹¹

While this V-Loan activity was an important function, the main channel of effort for the Federal Reserve banks and our commercial banks was the financing of the war needs of the Treasury. A measure of this accomplishment may be had from the following summary:

"Between June 30, 1940, on the eve of the defense program, and the end of 1945, the government raised approximately 380 billion dollars. Of this, 153 billion dollars came from taxes, or about 40 per cent. The remainder, 228 billion, or about 60 per cent, was raised by borrowing, that is, by increasing the public debt. Of the total borrowed, 133 billion, or about 60 per cent of the borrowing, came from selling Government securities to investors other than commercial banks and the Federal Reserve Banks. Approximately 95 billion dollars, or 40 per cent, was raised by selling securities to the commercial banking system."¹² The twelve Federal Reserve Banks alone came out of the war owning some \$22 billion of government securities.

We had succeeded in financing the greatest of wars. The funds raised for the use of government vastly exceeded what most persons would have considered within the range of possibility. This was accomplished smoothly and without untoward incident. It was effected almost wholly through the operation of our normal banking machinery. Except for the moderate regulations on installment purchases, charge accounts, and margin loans on securities, no wartime forcing controls were used. In last analysis, the success of war finance was an achievement based on the voluntary support of a free people.

Gratifying as this result seems, the final chapter is yet to be written. We have noted that the Treasury succeeded in borrowing immense sums

for war needs at an average interest cost of less than 2 per cent. This is a tragically deceptive figure. What the ultimate cost will be is yet to be determined. Nations do not go through such financial adventures without paying a price. Ours will be measured by postwar adjustments required to compensate for the inflationary forces generated by wartime financing.

We have been left in a vulnerable position. The nation's money supply has been tripled. Beyond that however is the staggering amount of government debt. At upwards of \$250 billion, it is over 5 times that of prewar or over 12 times that of 1932. This is equivalent to over \$8000 for each family or consumer unit in the United States. Such a huge bulk of federal debt by its mere existence deprives government of important fiscal liberty and imposes restrictions upon the whole economy. For example the Treasury is under great pressure to continue easy-money policies. But this in itself is inflationary and when combined with a large increase in credit may work severe damage to the economy.

These are bewildering problems. That does not mean that they are insoluble. We are constrained to learn new things.

CONCLUSION

Freedom and Abundance

W^{ELI.}, to what does all this add up? For slightly over 300 years the American people have been building a business system. We have noted the sparse fibers of the start as early colonists bartered with the Indians and traded among themselves along the coast. Then their thoughts turned to broader horizons as little ships like the *Trial*, built in Boston in 1642, adventured to the Azores and West Indies with tiny cargos of pipe-staves and dried cod.

From this birth of Yankee foreign commerce we watched the growth of expanding business down through some ten generations, as our capital funds multiplied and our skills developed. We saw the coming-in of cotton mills, railroads, electric power, and our great manufacturing industries.

We have observed the accelerated pace of the twentieth century as production achievements brought a phenomenal rise in our standard of living. Finally we have seen this system brilliantly meet its greatest test as it supplied us with the armament needed successfully to repulse two massive assaults by aggressor nations upon American freedom.

Quite a record! One is therefore prompted to inquire how all this came about. How was it that the few handfuls of colonists who landed on the Atlantic coast started such an important progression in world affairs? How was it that they and their descendants not only succeeded in colonizing a difficult frontier but founded a nation and new way of life as well?

Environment played an important role. Settlers developed outstanding qualities of aggressive and constructive enterprise. They were resourceful, hard working, practical and thrifty. At the same time they evinced a marked flair for the adventures of commerce.

That this should have come about Professor Toynbee finds quite natural. It is his contention that a challenge to survival brings out dynamic qualities in a people. Such challenge, however, must not be too severe or a factor of diminishing return comes into play. The desirable balance he calls his Golden Mean. He finds that it existed along the middle section of our Atlantic coast. He therefore reasons that the cli-

mate of these areas engendered a successful breed and developed in it traits which have since characterized the American people.¹

Nor did the favorable influence of environment stop with the eastern seaboard. Descendants of the early colonists and others pressed westward over the Wilderness Road, the Erie Canal, and the first railroads to bring into production the vast, fertile areas of the Ohio-Mississippi basins. Thence, like a tide in flood, the western pioneers swarmed over the eastern benchlands of the Rockies and finally breached the mountain barriers. Pushing onward they took the California valleys and the Pacific coast.

Thus for almost 300 years our people had a frontier. It provided a beckoning door of opportunity. Moreover it fostered a spirit of self reliance, resourcefulness and raw democracy. It served as an anvil on which the temper of the breed was struck to more durable quality.

But it was not merely a matter of climate and geography. These indeed were favorable. In addition were the immense natural resources of North America. Our forbears chanced upon the greatest array of treasure yet made fruitful to the sons of Adam. There existed on that part of the globe to which they fell heir a combination of things ideally adapted to the development of agriculture and the building of a modern industrial economy.

In a way of speaking we had everything. Great supplies of edible fish swarmed off both the Atlantic and Pacific coasts. Vast areas of workable timber were scattered through our domain. Millions of acres of fertile agricultural land lay in the Mississippi watershed.

Most potent, however, for the new industrial age were our mineral resources. We were possessed of incredibly vast supplies of fuel—coal, petroleum and natural gas. From these comes the energy which enables workmen with machine tools to multiply the product of their labor. Similarly our mineral resources gave us enviable stores of raw material. The Lake Superior Mesabi iron ore deposits, coupled with accessible sources of coking coal, were enough in themselves to make any nation great. In addition we had gold, silver, copper, lead, zinc, limestone and other useful minerals.

Having admitted the richness of our inheritance, let us also register its correlative. This immense wealth did not yield itself up for the asking. Its development called for gruelling labor, persistent thrift, inventive capacity, courage and chance taking. Important as were these qualities something more was required. It has been said that our forbears were God fearing. Rather, they were God trusting. They, for the most part, possessed an active, abundant faith and made it integral with their daily lives.

Our frontiers were pressed westward and a continent conquered through the force of a people who possessed spiritual as well as physical strength.

But the first colonists to hit the hard-scrabble of the New England coast or the less forbidding lowlands to the west and south, had not the faintest intimation of the wealth of this continental treasure-house. Nor were they inclined to philosophize upon the long-term aspects of their environment.

What they sought was the opportunity moderately to improve their standard of living and to secure a little more individual *lebensraum*. Toward these ends they strove lustily. Foreign trade became the essence of their economy because only by it could they pay for manufactured goods from Europe. When in the later period England sought to restrict its growth, as well as the development of colonial industry, her acts were as an order to abandon hope. This was intolerable. The colonists came to understand that to have economic freedom they must have political liberty—that the two were inseparable.

Following the Revolution, the colonists were faced with a new problem. Having attained political and economic freedom it was found that these in themselves were not enough. As a Confederation the thirteen colonies presented a pitiful exhibition. Each sought to go its own way in an attempt to justify its position as a sovereign state. They indulged in a veritable debauch of legislative self-expression.

Under these conditions commerce tended to be circumscribed by state boundaries. Trade languished and economic chaos threatened. Profits, wages, standards of living were all in jeopardy. This pressure on the business interests of the colonies, the merchants, the planters and the fishermen, engendered thoughts of better governmental organization. They now became aware that the broader concepts of freedom could only be attained through a measure of political self-discipline. An important degree of local sovereignty must be surrendered to national authority. Activated by these necessities, our people rose to their supreme political achievement—the adoption of the Constitution.

Actually it was a Bill of Rights for a free enterprise economy. Toward such end it set up the political framework within which the aspirations of the American people could be made secure. The Constitution became a great charter not by reason of abstract political principles but rather because of its recognition of human realities—the essential dignity of the individual, his right to liberty of conscience, equality of opportunity, and legal protection for both life and property. Under it the state became the servant and not the master. "We the people of the United States . . . do ordain and establish . . ."

Thus from the grass-roots up and through the hard-bitten necessities of commerce were we evolving a new order—the American system. It was predicated upon giving every man a chance. No one ever so humble but could hitch his wagon to the soaring star of the new continent. He could choose his own field of endeavor. He could acquire property and set himself up in business or agriculture. Government intervention in the economy was kept to a minimum. Mercantilism was thrown overboard. Monopolies were outlawed. In large measure class distinctions were broken down. Conditions both in politics and business were democratic. In consequence powerful energy was released, giving scope to talent wherever it might lie. Again and again were we to learn that some of the most fruitful would come from unexpected quarters.

What this freedom meant to most of our people was the opportunity to get ahead, to increase their share of this world's goods. Mere survival is a bare-bones reward and calls forth uninspired effort. But the chance to improve one's scale of living brings out energy of unlimited power.

Individual liberty and boundless opportunity fostered a spirit of enterprise and adventure over a broad front. Not only did we open new territorial horizons, but also rich ones in the fields of production. It has been said that "Free minds are inventive minds."² Thus men like Whitney, Slater, Lowell, Howe, McCormick, and a host of others gave us improved tools of production and established the heritage which has since prospered so mightily in this country. Old World methods of time-consuming, manual processes became a challenge which our mechanics could not resist. To meet it they evolved myriads of automatic operations for producing goods in quantity. "Yankee ingenuity" became a by-word 'round the globe.

But these inventions and improvements would have yielded meager results had it not been for another quality which blossomed under the American system. This was the talent of business management, the so-called entrepreneurial capacity. In it are comprised the ability to plan new adventures, to raise capital, to apply inventions, to evolve production techniques, to develop markets and, in the end, to come up with a profit. These attributes in turn derive from self-reliance and resourcefulness, bred through generations of frontiersmen and small proprietors under conditions of broad opportunity wherein the fittest were constantly forging to the top.

The most rewarding field of opportunity for this talent of business management has been to give practical application to the discoveries of science in the use of mechanical power. To this more than to any other factor must be credited our rising standard of living. Our reserves of

accumulated capital and experience in management have enabled us to apply machines and mechanical processes on a broad scale.

Down to the middle of the nineteenth century the pace of this mechanization of production was moderate. Shortly before the Civil War, human beings and their work animals contributed over 90 per cent of the energy required to produce our goods and services. We were still in a muscle-bound economy.

A scant three generations later the amount of energy secured from mineral fuels had been multiplied about 260 times and the situation had been reversed. "By 1940, fully 90 per cent of our energy output came from minerals, and only 10 per cent from human beings and animal workers combined. . . ."

In consequence we have shared in a growing abundance. Between 1850 and 1940 our national income after adjustment for variations in the purchasing power of the dollar increased over sixteen times, although during that period the number of workers grew about six and a half times. Not only did the workman produce more per hour but he labored fewer hours. The average work-week declined from about 72 hours to around 43.⁴

Nor has this broad use of machines been at the expense of fewer jobs. Quite the contrary. There has been an increase in the relative proportion of our people gainfully employed. Most notable of course has been the opening of new horizons of opportunity for women in the economic order. That bogey of twentieth century agitators, "technological unemployment," turned out to be a myth.

But this revolutionary change by which man's productive output was multiplied by mechanical power hung yet upon another factor. Large sums of capital were required. Steam plants, engines, generators and machine tools are expensive. Fortunately the American system favored the rapid capital formation which was needed.

Under its broad freedoms liberal reward was given to those who would save and invest. It paid to be thrifty. Capital yielded its owner both a higher standard of living and greater personal liberty. For millions of our people the unspent wages of one day became the invested capital of another. Thus wages and capital are of the same essence.

For upwards of sixty years after the Civil War, thrifty Americans plowed back through reinvestment an average of about 14 per cent of each year's national income. In the aggregate this was a huge sum. As a result it is estimated that today for each workman employed in industry we have invested somewhere between \$6000 and \$8000 to provide him with tools and working quarters.

CONCLUSION

This capitalism is almost as broad as the people themselves. It includes all who have savings accounts, life insurance, or who own securities, businesses or real property. With some 35 million households or consumer units in the country, there are more than 45 million savings accounts and 78 million persons invest in life insurance. It is estimated that these two capital pools now aggregate over \$100 billion. Big money owned by little people.

Thus millions of our citizens are in effect lenders of capital funds which flow out to assist in building new homes, modern plants and improved facilities. A sound and important function which serves to foster a more dynamic one. From the days of Yankee cod-peddling down to those of promoting television companies, Americans have had a zest for adventuring with their capital. As a result there are today upwards of 8.8 million business enterprises and about 6 million farms in the United States. Our corporations have an aggregate of some 9 million stockholders. Moreover new enterprises ranging from soy bean production to the selling of radioactive isotopes are being started at the rate of over 200,000 annually. Some of these fall by the wayside, others prosper moderately and a few ultimately become giants of industry.

To Europeans conditioned in their more regulated, or quasi socialistic systems, all of this undirected energy of Tom, Dick and Harry appears as something verging on chaos. It seems a waste of capital and effort. "Americans are so naive. It is all so unplanned." But is it? Talent is where God puts it. What better plan than to give every man a chance?

This system has paid off. Freedom for the play of enterprise and unfettered release for inventive genius according to its own impulse, have enabled us to turn our natural resources to widespread common account. Our people enjoy the highest standard of living in the world. The tempo of its advance during the twentieth century has been more rapid than ever before. So today Americans who comprise less than 7 per cent of the world's population possess one-third of its wealth.

Our 35 million households or consumer units enjoy the use of over 28 million motor cars, 80 million radios, and share in the use of our 36 million telephones. The far flung electric utility industry serves 30 million residential customers with electric light and energy for operating refrigerators, washing machines and vacuum cleaners.

In addition the free private economy contributes indirectly to other broad fields of service to raise our standard of living. The maintenance of roads, hospitals, schools and public facilities of various kinds is made possible only by diverting part of our productive output through channels of taxation. In the last analysis what we hand over to the tax collector is a

portion of the goods or services we produce just as surely as did our colonial forebears when they actually paid their imposts with corn or hogs on the hoof.

So to answer the question, "What has this American system meant to me?" we can in the first instance point to these accomplishments relating to our material well being. Such matters however comprise the lesser part. The significant thing is that we enjoy individual freedom. We may work where we please. We may be proprietors and build our own businesses. We may labor as employes and as such have the right to organize with our fellows and even to use the powerful weapon of the strike in order to maintain or improve our position. We may possess property and use or abuse it. We are free to think as we please and give our thoughts public expression. We enjoy the unhampered right to choose the officials who carry on our government. Most important of all we have freedom of conscience.

We possess these priceless riches because we formed a system of government dedicated to preserve them for each individual irrespective of the hazards of fortune or accidents of birth. "All men are . . . endowed by their Creator with certain inalienable rights . . ."

Contributing in no small degree to these concepts has been the profit motive. Scorned by the Marxist, who would deny the "inalienable rights" of the individual, it is an inherent part of man's make-up. To own property and to attempt to improve one's scale of living are inseparable aspects of the urge to live creatively.

From the beginning the American system recognized the legitimacy of these considerations. As a result, our accomplishments in the field of business fostered those in the realm of politics and vice versa. Free play for the profit motive resulted in more goods for more people. Abundance contributed an environment favorable to orderly democratic government.

So the record of American enterprise down through 300 years is one of magnificent achievement. There is however no room for complacency. Our system now faces its severest test. An alien, hostile philosophy, subtly deceiving in its import has taken hold of the minds of men in many parts of the world. It promises increased security, more goods and greater content. Certainly a beguiling appeal. The record, however, belies the prospect on all counts. Further, kept carefully under wraps, is the fact that the price to be paid is the sacrifice of individual freedom. The state, or rather an entrenched autocracy, succeeds to "We the people." It is a device of Lucifer and a deception as old as the hills.

This attack upon our system can only succeed if we ourselves are inert. We are called on to justify our concepts by deeds rather than by precepts. To succeed in this we must face the fact that there remains much to be done. The structure we have been building is only partially complete.

A glaring weakness is the wide discrepancy between the lot of the many who have much and that of a minority who possess little. There are still too many of our people who live in poverty. We have the capacity to produce an abundant share for all. Our goal is to enlarge the portion of the less fortunate without retarding the dynamic progress of a free system.

Moreover the complex industrial machine which we have erected lacks stability. Swings from high prosperity to low depression are frequent, and inordinately pronounced. It is essential to mitigate these "boom-bust" characteristics. Their down-surges not only impose acute distress upon millions of our people but shake the social and political order as well. To maintain the American way of government we must stabilize and secure the American way of business. The two are integral.

These and other problems, all inter-related, remain to be worked out. There are those in the field of labor relations where the interests of workmen, management and the public have to be reconciled. Similarly the farmer in his search for security raises complex issues. In the realm of politics there is that disturbing development of later years—the increase of pressure group activity. On its part government faces the handling of our huge debt and the management of an inflated currency. Then of basic import are matters relating to the conservation of our natural resources. Finally, and perhaps most baffling of all, are the questions posed by the new leadership in international affairs which the United States has been constrained to assume.

All are serious problems. They are but aspects of a deeper one. Can this generation muster the moral and spiritual strength needed to direct the social, scientific and economic orders which have been devised? Is Man to be master or slave of his own creations?

The answer can only be provided by the purposeful effort of a united people. But the moral force of a nation derives solely from that of its citizens. We are all called up for service—butcher, baker and atom-splitter. We must renew those sources of spiritual strength which enabled our forbears to give new meaning to human freedom. We must see in life something beyond an accumulation of gadgets. Self interest must achieve that enlightenment which perceives that its best reward lies in the common advance. Individuals and groups in the United States are summoned to a new unity and a high destiny.

NOTES

CHAPTER II

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CHAPTER III

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